

Appendix 1:

Sampling and Analysis Plan (SAP)
For the Salzburg Landfill Operating License

(Parts 111 & 115 of Act 451)

Groundwater Protection Monitoring
Leachate Monitoring
Leak Detection Monitoring
Surface Water Monitoring
Ambient Air Protection Monitoring
Soil Monitoring

The Dow Chemical Company

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1.0 Introduction and Scope

This Sampling and Analysis Plan (SAP) was created as a requirement for The Dow Chemical Company (Dow) Salzburg Landfill (the Landfill) Operating License under Act 451, Part 111 and post-closure under Act 451, Part 115. This SAP describes and lists procedures for monitoring of the following media at the Landfill:

- Groundwater;
- Leachate;
- Leak Detection;
- Surface Water;
- Ambient Air; and
- Soil.

2.0 General Procedures and Guidelines

The General Procedures and Guidelines section includes guidelines that apply to all sampling conducted under this Sampling and Analysis Plan. Guidelines that apply specifically to the groundwater, leachate, liner failure detection, surface water, ambient air, and soil monitoring programs can be found in subsequent sections. Trip and field blanks, as well as field duplicates, can be reduced if more than one media is sampled in a day.

2.1 Pre-Sampling Procedures

1. Review Table 2-A to determine when sample event is to occur and what samples are required;
2. Notify team members and customers of planned sampling dates;
3. Prepare labels with facility identification (ID) and parameter(s);
4. Label chain-of-custody form(s) with facility ID and parameter(s);
5. Gather necessary bottles (reference Table 1);
6. Gather applicable sample collection equipment (examples shown below):

Bottle carriers	Milli-Q water for Field Blanks	Deionized water
Ice chests w/ice	Necessary preservatives	pH/Conductivity meter
Thermometer	Buckets for purging	Filtering equipment
Carbon chambers	Extra bottles	Dedicated/disposable bailers
Field Data Sheet	Generators	Gas/oil for generators
Adapters for wells	Sampling Procedures	Life vests
Eye shower	Compass	Labeled bottles
Chains-of-custody	Static Water Level meter	Gas sampling equipment
Gloves	Goggles	2-way radio
Stainless steel spoon	Stainless steel cutting knife	Stainless steel scraper
Tweezers	0.25-inch stainless steel Sieve	Scrubbing brush
Ottawa sand standard	Re-sealable plastic bags	Laboratory grade detergent
Stainless steel bowl or disposable aluminum pan		
One-inch diameter stainless steel soil survey probe		

7. Field instruments will be calibrated, per manufacturer's instructions, prior to use each day and noted on a field data sheet. The pressure gauge will be calibrated in accordance with manufacturer's instructions.

2.2 Documentation/Chain-of-Custody Procedures

Appropriate documentation is essential to ensure the possession and handling of samples is traceable from the time of collection through analysis and final disposition. This documentation of the history of the sample is referred to as “chain-of-custody”. Chain-of-custody documentation includes:

- Sample labeling;
- Field data sheet (example in Attachment G); and
- Chain-of-custody form (example in Attachment D).

A person who has samples in custody must comply with these Chain-of-Custody Procedures.

During collection, analysis and final disposition, samples are considered to be under a person's custody when:

- The samples are in a person's physical possession;
- Are in view of the person after taking possession;
- Are secured by that person so that no one can tamper with it; or
- Are secured by that person in an area that is restricted to authorized personnel.

Samples must be labeled to prevent mis-identification. Sample labels will be affixed to sample containers prior to or at the time of sampling. Sample labels will contain the following information:

- Sample number;
- Name or initials of sampler;
- Date and time of collection;
- Place of collection; and
- Analysis to be performed on the sample.

Information pertinent to a field survey or sampling will be recorded on a field data sheet, included in Attachment G. It is essential that all samples be collected properly and that actual conditions during each sample collection be completely documented. Field parameters shall be taken immediately after the sample has been collected and recorded on a field data sheet. At a minimum, entries on the field data sheet will include the following:

- Location of sampling point;
- Sample number;
- Name or initials of the sampler;
- Date/time well was purged and sampled;
- Number and volume of sample taken;
- Analyses to be performed on samples;
- Static Water Level (SWL) reading;
- Purge volume;
- Field parameters (such as temperature, pH, specific conductivity); and
- Additional field information determined by the sampler to be important (i.e. abnormal conditions, well damage, weather conditions, nearby construction/traffic).

Additional field documentation will include sufficient information to allow reconstruction of the sampling without reliance on the sampler's memory. A permanent writing instrument should be used to record all information on field data sheets. The proper correction technique is to draw one single line through an error and initial/date it at the point of error.

2.3 Equipment Decontamination Procedures

To minimize sample contamination problems, dedicated sampling (or well evacuation) equipment will be used whenever possible and new pre-cleaned containers are to be used. The use of dedicated equipment is not always possible; therefore, a procedure for cleaning of and sampling with non-dedicated equipment is critical in obtaining representative samples. If non-dedicated sampling equipment is used, an equipment blank must be obtained. When non-dedicated sampling equipment is used, the equipment will be cleaned initially by the procedures described below. The wells will be sampled in order of cleanliness, if known (i.e. upgradient before downgradient). Between sampling points, the equipment will be rinsed with deionized water and rinsed with the well water before the sample is taken. Depending on the piece of non-dedicated equipment used (e.g. submersible pumps,

non-disposable bailers, stainless steel soil sampling tools, surface water dipper) non-phosphate detergent may be used to thoroughly clean the equipment. See section 3.1.2 regarding the decontamination of the SWL meter between wells.

2.3.1 Pre-sampling Decontamination of Non-Dedicated Sampling Equipment

1. Hot water and soap wash using non-phosphate detergent.
2. Hot tap water rinse.
3. Deionized water rinse and air dry.

2.3.2 Pre-sampling Decontamination of Static Water Level Meter, pH/Temperature/Conductivity/ or other Field Measurement Probe(s)

1. Hot water and soap wash using non-phosphate detergent.
2. Hot tap water rinse.
3. Deionized water rinse and air dry.

2.4 Purge Water Management Procedures

Purged water from wells where previous analyses have not identified chemical impact will be diverted away from the well and discharged onto the ground. Purged water from wells where there is no prior analyses or where prior analyses has identified chemical impact will be collected in a portable holding tank. All collected, purged water will be treated at the Dow Waste Water Treatment Plant via discharge to the on-site sewer, or an equivalent facility.

2.5 Sample Preservation

Sample preservation techniques are used to retard the chemical and biological changes that inevitably continue after the sample is removed from the parent media. Therefore, as a general rule, it is best to analyze the samples as soon as possible after collection within the prescribed hold times as outlined in Table 1. Sample preservation may be done prior to or immediately following collection of a sample. Preservatives added after sampling should be done in the field.

Methods of preservation are relatively limited and are intended generally to (1) retard biological action, (2) retard hydrolysis of chemical compounds and complexes, (3) reduce volatility of constituents, and (4) reduce absorption effects. Preservation methods are generally limited to pH control, chemical addition, refrigeration, and freezing. Caution should be used while adding preservatives or filling pre-preserved bottles, as preservatives typically exhibit very high or very low pH and may cause burns. The current practice is to use pre-preserved bottles. Constituent and media specific preservation methods are presented in Table 1.

2.6 Sampling Procedures

All samples shall be collected in appropriate bottles (see Table 1). If an open bottle is found in the manufacturer's box, this bottle will be discarded. All sample and blank bottles will have a label affixed that is readable and clear. In liquid volatile samples, no head space must occur in the 40-ml glass vials. If zero-head space is not possible, this must be documented in the field data sheet. Soil volatile and semi-volatile samples shall not be composited. New gloves shall be used at each sampling location or any time items other than the clean sampling tools/bottles are handled. Care must be used while handling sample containers and caps so that contamination is not introduced during the collection process. Liquid dissolved metal samples will be filtered as soon as possible with a 0.45 μm pore size glass in-line filter. Prior to filling bottles, allow liquid to discharge through filter briefly. Liquid total metal samples will not be filtered.

If a sample is unable to be collected due to icy/frozen condition or the sample location point is inaccessible for some reason, a sample should be collected as soon as the condition allows during that same quarter.

2.7 Sampling Sequence

Samples should be collected and containerized according to the volatility of the target analytes. The field parameters can be measured prior to sample collection and recorded on the field data sheet. The proper collection order is as follows:

1. Volatiles;
2. Semi-Volatiles (Extractables, EOAs);

3. Total Organic Carbons (TOC);
4. Metals and Cyanide; and
5. Any other parameters.

2.8 Post-Sampling Procedures

1. Prior to leaving the site, ensure all field data has been recorded on the field data sheet.
2. Transport samples on ice to appropriate locations.
3. Transfer samples along with chain-of-custody form(s) to analysts.
4. Clean all sample equipment as described in Equipment Decontamination Procedures.
5. Document any damaged wells, unsafe, or abnormal conditions noted during sampling on the field data sheet and notify the landfill technical advisor.

2.9 Maintenance & Inspections

During each sampling event, all monitoring locations will be inspected for integrity, damage, and/or safety issues. Monitoring wells may be inspected for damaged well casings, protective covers, fittings, and pump heads; missing locks and labels; signs of corrosion or surface erosion; reduced well performance; malfunctioning equipment; standing water at the well; and/or leakage. This inspection will be documented on the well inspection sheet (See Attachment G). Other media will also be inspected and findings will be documented on the respective field data sheets. Lift stations and collection sumps may be inspected for damaged or missing manhole lids, locks, and/or labels. Surface water outfalls may be inspected for evidence of erosion or sediment transport, outfall blockage, and/or missing labels. Ambient air monitoring stations may be inspected for damaged timers, gauges, and/or power supply. Soil boxes may be inspected for damaged and/or missing box markers, labels, or barricades.

Any deficiencies will be documented and reported to the landfill coordinator for appropriate corrective action(s).

2.10 Quality Control and Assurance

All samples collected and analyzed per this SAP will be maintained by good quality control and good laboratory practices. The Quality Control statement is located in Attachment A. In addition, the Dow Environmental Laboratory Quality Assurance Program is located in Attachment C.

2.11 Data Analysis & Reporting

All data collected per this SAP will be analyzed and reported according to the respective section of Table 2-A, Sample Collection Chart.

Data for samples that are analyzed for the 17 International Toxic Equivalency Factor (ITEF) dioxin and furan isomers and for the total tetra- through octa- dioxin and furan congener groups, will be expressed as toxic equivalent concentrations (TEC) based on ITEF. For samples where a specific congener was not detected, one-half the detection limit of that congener will be used to calculate the TEC for that sample. TEC results for duplicate samples will be averaged prior to evaluating data.

Four reports will be submitted to the MDEQ: (1) First, Second, and Third Quarter Reports and (2) Fourth Quarter Report and Annual Summary. The First, Second, and Third Quarter Reports will include analytical summary tables; quality control data; sampling map; brief narrative of sampling events for all environmental media, including sampling event dates, identification of any significant problems with respect to SAP procedures; copies of field data sheets; any problems in sampling, testing, or results; summary of statistical tests and any follow up required. The Fourth Quarter Report and Annual Summary will include all of the above, plus the following: copies of field data sheets, if not already provided; hydrographs or other hydraulic diagram; a summary of environmental monitoring data results, including a narrative summary of results, trends and Stiff diagrams of tracking parameters; and discussion of lab and field related QA/QC information.

2.12 Future Updates to SAP Procedure

This SAP may need to be updated periodically and submitted to the DEQ for review and approval. If approved, the revisions to the SAP shall become part of the Operating License without the need for a minor license modification. For each update to this SAP, no matter how minor, the complete document is to be updated and given a revision number/revision date. Additionally, each revision will be recorded on Table 8, Record of SAP Revisions.

3.0 Groundwater Monitoring Field Procedures

The Groundwater Monitoring Field Procedures section includes guidelines for obtaining hydraulic reading/static water levels from groundwater wells, well purging, and collecting samples. General procedures and guidelines for all sampling media are discussed in the General Procedures and Guidelines section.

3.1 Hydraulic Readings / Static Water Levels (SWL)

All monitoring wells will be protected by a locking protective casing with a Dow lock. The wells will be inspected for physical damage and any problems that may have occurred will be documented on the well inspection sheet (see Attachment G).

Static water level (SWL) readings will be obtained prior to purging. SWLs from all wells will be obtained during a single 24-hour period, according to the locations and frequency specified in Table 2-A, Sample Collection Chart. The SWL will be recorded on the field data sheet (see Attachment G). There are two techniques used to obtain SWL readings: one for flowing wells (pressurized) and another for piezometers and monitoring wells.

3.1.1 Flowing Wells

For flowing wells, a SWL will be calculated from pressure readings taken from the valve stem on the top of the well head. A digital pressure gauge (typical gauge range is 0 to 500 inches of water) is attached to a valve stem and the water level will be read in inches of water. Pressure readings shall be obtained within a period not to exceed 24 hours prior to sampling, following the directions below:

1. Open valve on the well head to allow pressure to equalize behind the valve stem.
2. Turn on the pressure gauge by pushing the red button and checking the LED to make sure batteries are working.
3. Attach the air fitting on the pressure gauge to the valve stem on the well head.
4. Give the pressure gauge time to stabilize (approximately one minute).

5. Record the pressure reading in inches of water.
6. The measured SWL (in feet) will be equal to Top of Casing (TOC) plus the measured pressure, according to the following equation: $SWL (ft.) = TOC (ft.) + [Pressure (in.) / 12]$.

3.1.2 Piezometers and Monitoring Wells

Foreign substances other than the indicator probe will not be introduced into the well casing. An electric water level indicator will be used to determine the SWL. An indicator tape graduated in hundredths of feet will be used. Prior to use, clean the SWL indicator with deionized water and a clean paper towel, followed by another water rinse. This prevents cross contamination between wells. Next, test the SWL indicator by turning it on and depressing the test button. There is an audible tone indicating the SWL indicator is working. Measure the SWL using the following steps:

1. Lower the SWL indicator probe into the well casing slowly until the tone is audible. At this point, the SWL has been reached.
2. Static water level readings should be taken consistently from the same location at the top of the well casing, which could be done by permanently marking the casing via placement of a mark or notch.
3. The SWL indicator probe should be lifted at least a few inches above the water level and then lowered for another SWL reading. Continue this until a consistent SWL reading has been confirmed.
4. Record the SWL to the nearest hundredth of a foot in the field data sheet.
5. Slowly remove the indicator probe from the well, and remove any liquids using paper towels. Dispose of waste towels appropriately.
6. The SWL indicator shall be triple rinsed with deionized water and wiped dry between rinsings after every SWL reading.
7. Store the SWL indicator in a clean dry place when not in use (See section 2.3.2).

3.2 Well Reference Elevations

Well casings will be referenced to a USGS reference datum elevation. See Table 3 for monitoring well specifications. Wells will be surveyed after new installations, upgrades, repairs, or every three years, beginning in 2009.

3.3 Well Purging

Purging and sampling will be completed as specified in Table 2-A.

After collecting a SWL reading and before sampling a well, the stagnant water in the well casing needs to be removed to insure that a representative sample can be taken. The procedure used is to remove three well casing volumes of water. This is done by bailing, pumping, or by opening the valve on a flowing well. It is first necessary to determine the quantity of water contained within the well casing. This is done by subtracting the depth to standing water from the depth of the well. The depth of each well is listed on the field data sheet. The difference between the well depth and the water level depth is the height of water standing within the well. Multiply this height of water by 0.17 (gallons per foot for a 2" diameter well) for a total volume of water in the well casing. Multiply this sum by 3 (the number of well volumes to be removed) which is the minimum recommended. Refer to Table 3 for a list of pre-determined purge volumes.

3.3.1 Equation for Purge Volumes

Well Depth – SWL = Feet of Water

Feet of Water x 0.17 = Total Water in Well Casing

Total Amount of Water x 3 = Purge Volume prior to sampling

Specific procedures used to purge a well are listed below, in Section 3.3.2-4.

3.3.2 Flowing Wells

Flowing wells are positive pressure wells. Since the well casing is full, the well volume has already been calculated and is on the field data sheet. Flowing wells will be purged by opening the discharge valve. When purging flowing wells, the water flow shall be diverted away from

the well so it does not gather around or seep back into the well. The well will be sampled when purging is complete. If a well is effectively pumped dry, the well will be sampled within a 24 hour period.

3.3.3 Submersible Pump Wells

Each well has an electrical fitting on the well head that is to be connected to the appropriate pump controller (110 or 220 volt). Purge the well using the following steps:

1. Start the generator at a down-wind location and allow it to warm up.
2. Plug the controller into the generator, making sure the controller is turned off and at the lowest setting.
3. Attach the controller lead to the well head connector.
4. Turn on the controller with the red switch marked start.
5. Adjust the flow rate with the variable control dial to the desired flow rate.
6. Sampling may commence after stabilization. If a well is effectively pumped dry, the well will be sampled within a 24 hour period.

3.3.4 Pumping Rates & Stabilization

Well purging is conducted to obtain samples from the wells that are as representative as possible of conditions in the formation. The rate at which wells are purged should be kept to a minimum to prevent dewatering the well filter pack to the greatest extent possible. Excessive purging rates and filter pack dewatering can result in increased turbidity of water samples which limits the quality of the samples. Purging can be considered complete prior to removal of three well casing volumes if field parameters such as pH, specific conductivity, and temperature have stabilized, or the well has been pumped to dryness. Sampling may commence after stabilization, provided the purging rate does not increase significantly.

3.3.5 Low Flow Groundwater Purging

In some special cases it may be necessary to conduct low flow purging at the site, however, this is not the currently specified purging method for periodic monitoring. Low flow groundwater purging consists of purging a well at a rate slow enough to minimize turbidity, eliminate gas exchange between the sample and the atmosphere, and obtain groundwater from the surrounding soils instead of stagnant water in the well casing. Purging should be conducted with the pump intake at the middle or toward the top of the screened interval. While purging, record measurements of the following secondary parameter values:

- Static water level;
- Flow rate;
- Dissolved oxygen;
- Temperature;
- Specific conductivity;
- pH;
- REDOX potential; and
- Turbidity.

This can assist in determining when formation water is being removed from a well. At the point when the secondary parameters are observed to stabilize, formation water is being obtained and sampling can proceed. Site specific stabilization criteria are typically determined when the previous three or more readings for each parameter (taken at regular time intervals, typically three minutes) are within defined acceptable ranges. Default criteria applied to the last three readings are as follows:

Parameter	Default Stabilization Criterion
Dissolved Oxygen	+/- 10%
Specific Conductivity	+/- 3%
pH	+/- 0.1 SU
REDOX potential	+/- 10 mV
Turbidity	< 10 NTU or +/- 10% if >10 NTU

Sampling may commence after stabilization, provided the purging rate does not increase significantly. Turbidity is the most conservative indicator of stabilization as it is often the last to stabilize. Turbidity in groundwater samples may be naturally occurring, caused by sampling disturbances or filter pack siltation. Knowledge of site geology, well design, and sampling methodology is helpful in determining the source of turbidity and the method of sampling. Turbidity due to sampling disturbances should be eliminated or minimized while naturally occurring turbidity or turbidity due to contamination should not. Deviations from the default stabilization criteria should be noted on the field data sheet. In some cases, the default stabilization criteria will need to be supplemented with well or site-specific criteria. If parameter stabilization criteria are too stringent, then minor oscillations in indicator parameters may cause sampling to become unnecessarily protracted. If well or site-specific criteria are developed, they will be followed each time a well is sampled.

Static water levels in the well should be monitored periodically during purging to evaluate the level of drawdown in the well. Ideally, drawdown should be kept to $<0.1\text{m}$ during purging. This goal may be difficult to achieve under some circumstances due to heterogeneities within the screened interval, and may require adjustment based on well or site-specific conditions and past sampling experience. If well or site-specific criteria are developed, they will be followed each time a well is sampled.

3.4 Sampling Procedures

Field data and samples shall be obtained according to the location, frequency, parameters, and analytical requirements as specified in Table 2-A, Sample Collection Chart and Table 2-B, Routine Chemical Constituent, Analytical Method, and Reporting Limit List. The complete Dow Analytical Chemical Constituent, Analytical Method, and Reporting Limit List can be referenced in Attachment B. Complete a field data sheet for each well, as indicated in Section 2.2.

Sampling may commence after stabilization. If wells are effectively purged dry, wells should be sampled within 24 hours. Sampling will be done at the lowest continuous flow rate possible. If sampling does not immediately follow purging, the pump lines should be filled with fresh well water

pumped at the lowest flow rate possible before sampling. Inspect each well and pump for damage or tampering and document any changes in the well inspection sheet.

3.5 Trip and Field Blanks

Trip blanks will be prepared prior to sampling events and remain unopened throughout the sampling day. Trip blanks are used to evaluate the potential for contamination during equipment and sample transport. Laboratory testing of Trip Blanks is optional, and may be conducted if unusual or unexpected results are obtained during laboratory testing of groundwater samples. Untested Trip Blanks will be discarded. Bottles shall be prepared for all the parameters being sampled and the time they were prepared will be recorded on the field data sheet. Preservatives (if necessary) will be added at the time the bottles are filled, to prevent opening the bottles in the field. At the end of the sample event, trip blanks will remain with the samples collected and will be analyzed as appropriate. Trip blanks for liquid samples should be water free of constituents in question.

One field blank shall be prepared for every sampling event. Field blanks will be submitted for each parameter and treated in the exact same manner as the rest of the samples. Field blanks are needed to evaluate the potential for contamination during sampling. The field blank media will be transported to the field in clean or new containers with the proper labeling. The field blank bottles may be filled at any time in the field during the sampling process. At the end of the sample event, field blanks will remain with the samples collected and will be analyzed as appropriate. Field blanks for liquid samples should be water that is free of constituents in question. Trip and field blanks can be reduced if more than one media is sampled in a day.

In the event that non-dedicated sampling equipment is used, an equipment blank must be collected during the sampling event and analyzed for the parameters that are sampled for. An equipment blank will be collected by pouring deionized or distilled water over or through the sampling equipment and collecting the rinsate in the sample bottles.

3.6 Duplicate Samples

Field duplicate sampling will be completed as specified by the analytical method used. At a minimum, one field duplicate sample will be obtained for every twenty samples collected or for each week of sampling. Field duplicates can be reduced if more than one media is sampled in a week.

3.7 Well Installation Cross-Contamination Prevention Procedures

A work plan for replacement of monitoring wells designated for periodic groundwater monitoring at the landfill will be submitted to MDEQ for review and approval. Additional or replacement wells at Salzburg Landfill should be installed in a manner which prevents cross-contamination, in accordance with ASTM D5092, or an approved plan. Soil boring equipment, tooling, and well materials should be thoroughly steam-cleaned prior to use at the site. All water used for steam cleaning should be obtained from a Regional Aquifer Well at Salzburg Landfill, or Michigan Operations. When drilling monitoring wells, a surface casing should be set to isolate the borehole from the shallow surface sediments. Lubricants should not be used on equipment that enters the well bore.

New PVC, rubber, or nitrile gloves should be worn by workers contacting the well string during installation. Teflon tape may be used to seal threaded joints on the well string or surface casing. Clean, bagged filter sand, unopened buckets of bentonite pellets, and bagged bentonite for grout will be used during well installation.

4.0 Leachate Monitoring Field Procedures

The Leachate Monitoring Field Procedures section includes guidelines for collecting samples of leachate from the waste disposal cells at Salzburg Landfill. General procedures and guidelines for all sampling media are discussed in the General Procedures and Guidelines section.

4.1 Sampling Procedures

Samples shall be obtained according to the location, frequency, parameters, and analytical requirements as specified in Table 2-A, Sample Collection Chart and Table 2-B, Routine Chemical Constituent, Analytical Method, and Reporting Limit List. Leachate sampling will be dependent upon sufficient leachate flow. Each lift station must be visually inspected to determine if there is sufficient leachate for sampling to occur.

Prior to sampling the lift stations, notify the landfill coordinator that sampling is going to be conducted. This notification is required to prevent triggering the automated alarms for the lift stations.

Lift stations are sampled with dedicated stainless steel bailers, or by sample port. To obtain a sample using a bailer, the lift station cover is removed. The bailer will be slowly lowered into the lift station and allowed to fill with leachate. After filling, the bailer is retrieved through the opening. Sample bottles are filled directly from the bailer. The retrieval string shall be disposable nylon string that is discarded after each use. To obtain a sample from a lift station with a sample port, sampling can begin after the lines have been purged of stagnant water. Sample bottles are filled directly from the sample port. After sampling, close the sample port and return the lift station to “auto” control, as necessary.

Complete a field data sheet for each lift station, as described in Section 2.2. Inspect each lift station for damage or tampering and document any changes on the field data sheet.

4.2 Flow Volume Checks

Leachate flow volumes will be recorded using flow meters. Data will be obtained and reported according to the location and frequency requirements as specified in Table 2-A, Sampling Collection Chart.

4.3 Trip and Field Blanks

Trip blanks will be prepared prior to sampling events and remain unopened throughout the sampling day. Trip blanks are used to evaluate the potential for contamination during equipment and sample transport. Laboratory testing of Trip Blanks is optional, and may be conducted if unusual or unexpected results are obtained during laboratory testing of leachate samples. Untested Trip Blanks will be discarded. Bottles shall be prepared for all the parameters being sampled and the time they were prepared will be recorded on a field data sheet. Preservatives (if necessary) will be added at the time the bottles are filled, to prevent opening the bottles in the field. At the end of the sample event, trip blanks will remain with the samples collected and will be analyzed as appropriate. Trip blanks for liquid samples should be water free of constituents in question.

One field blank shall be prepared for every sampling event. Field blanks will be submitted for each parameter and treated in the exact same manner as the rest of the samples. Field blanks are needed to evaluate the potential for contamination during sampling. The field blank media will be transported to the field in clean or new containers with the proper labeling. The field blank bottles may be filled at any time in the field during the sampling process. At the end of the sample event, field blanks will remain with the samples collected and will be analyzed as appropriate. Field blanks for liquid samples should be water that is free of constituents in question. Trip and field blanks can be reduced if more than one media is sampled in a day.

In the event that non-dedicated sampling equipment is used, an equipment blank must be collected during the sampling event and analyzed for the parameters that are sampled for. An equipment blank will be collected by pouring deionized or distilled water over or through the sampling equipment and collecting the rinsate in the sample bottles.

4.4 Duplicate Samples

Field duplicate sampling will be completed as specified by the analytical method used. At a minimum, one field duplicate sample will be obtained for every twenty samples collected or for each week of sampling. Field duplicates can be reduced if more than one media is sampled in a week.

5.0 Leak Detection System Monitoring Field Procedures

The hazardous waste cells at Salzburg Landfill are equipped with secondary liners that are used as the Leak Detection System (LDS). The Leak Detection System Monitoring Field Procedures section includes guidelines for collecting samples from the secondary liner lift stations. General procedures and guidelines for all sampling media are discussed in the General Procedures and Guidelines section.

5.1 Sampling Procedures

Samples shall be obtained according to the location, frequency, parameters, and analytical requirements as specified in Table 2-A, Sample Collection Chart and Table 2-B, Routine Chemical Constituent, Analytical Method, and Reporting Limit List.

Prior to sampling the lift stations, notify the landfill coordinator that sampling is going to be conducted on that day. This notification is required to prevent triggering the automated alarms for the lift stations.

Secondary liner lift stations are sampled with disposable Teflon or polyethylene bailers, or by sample port. To obtain a sample using a bailer, the lift station cover is removed. The bailer will be slowly lowered into the lift station and allowed to fill with liquid. After filling, the bailer is retrieved through the opening. Sample bottles are filled directly from the bailer. The bailer and retrieval string shall be discarded after each use. To obtain a sample from a lift station with a sample port, sampling can begin after the lines have been purged of stagnant water. Sample bottles are filled directly from the sample port. After sampling, close the sample port and return the lift station to “auto” control, as necessary.

Complete a field data sheet for each lift station, as described in Section 2.2. Inspect each lift station for damage or tampering and document any changes on the field data sheet.

5.2 Trip and Field Blanks

Trip blanks will be prepared prior to sampling events and remain unopened throughout the sampling day. Trip blanks are used to evaluate the potential for contamination during equipment and sample transport. Laboratory testing of Trip Blanks is optional, and may be conducted if unusual or unexpected results are obtained during laboratory testing of secondary liner samples. Untested Trip Blanks will be discarded. Bottles shall be prepared for all the parameters being sampled and the time they were prepared will be recorded on a field data sheet. Preservatives (if necessary) will be added at the time the bottles are filled, to prevent opening the bottles in the field. At the end of the sample event, trip blanks will remain with the samples collected and will be analyzed as appropriate. Trip blanks for liquid samples should be water free of constituents in question.

One field blank shall be prepared for every sampling event. Field blanks will be submitted for each parameter and treated in the exact same manner as the rest of the samples. Field blanks are needed to evaluate the potential for contamination during sampling. The field blank media will be transported to the field in clean or new containers with the proper labeling. The field blank bottles may be filled at any time in the field during the sampling process. At the end of the sample event, field blanks will remain with the samples collected and will be analyzed as appropriate. Field blanks for liquid samples should be water that is free of constituents in question. Trip and field blanks can be reduced if more than one media is sampled in a day.

In the event that non-dedicated sampling equipment is used, an equipment blank must be collected during the sampling event and analyzed for the parameters that are sampled for. An equipment blank will be collected by pouring deionized or distilled water over or through the sampling equipment and collecting the rinsate in the sample bottles.

5.3 Duplicate Samples

Field duplicate sampling will be completed as specified by the analytical method used. At a minimum, one field duplicate sample will be obtained for every twenty samples collected or for each week of sampling. Field duplicates can be reduced if these more than one media is sampled in a week.

5.4 Establishing System Baseline

Before waste is placed in any new cell or unit, a baseline concentration for constituents will be established. The system baseline will be determined by collecting at least 8 representative samples from the system that will be analyzed for the constituents in 40 CFR 264 Appendix IX.

During the first year following issuance of the license, flow rates will be monitored on a monthly basis and collect at least eight background samples of liquid from the leak detection system sumps for any parameters for which background is unavailable. Within 60 days after the last background sample is collected, the licensee shall submit a report to the Division Chief for review and approval that includes: a complete tabular summary of monitoring data used to calculate background concentrations, a description and summary of the statistical results, a tabular summary of flow rates, a proposed program for monthly monitoring, and an update to the SAP that incorporates the proposed program.

6.0 Surface Water Monitoring Field Procedures

Storm water at the landfill is discharged off site through the engineered conveyances shown in Figure 1. The Surface Water Monitoring Field Procedures section includes guidelines for collecting samples from those outfalls. General procedures and guidelines for all sampling media are discussed in the General Procedures and Guidelines section.

6.1 Sampling Procedures

Sampling will be completed according to the location, frequency, parameters, and analytical requirements specified in Table 2-A, Sample Collection Chart and Table 2-B, Routine Chemical Constituent, Analytical Method, and Reporting Limit List. Complete a field data sheet, as described in Section 2.2.

During each quarter, if there is a rain event greater than 0.5 inch and flow is observed through the outfall, surface water grab samples will be obtained. Samplers will receive an automated e-mail notification that a rain event greater than 0.5 inch has occurred. Grab samples will be obtained from the flow actively discharging from the outfalls within 24 hours of accumulation of 0.5 inches of rain. Samples will be obtained by either using a sampling cup or by filling new sample bottles directly at the outfall. Once a sample has been obtained during a quarter, no further sampling will be required during that quarter.

6.2 Trip and Field Blanks

Trip blanks will be prepared prior to sampling events and remain unopened throughout the sampling day. Trip blanks are used to evaluate the potential for contamination during equipment and sample transport. Laboratory testing of Trip Blanks is optional, and may be conducted if unusual or unexpected results are obtained during laboratory testing of surface water samples. Untested Trip Blanks will be discarded. Bottles shall be prepared for all the parameters being sampled and the time they were prepared will be recorded on a field data sheet. Preservatives (if necessary) will be added

at the time the bottles are filled, to prevent opening the bottles in the field. At the end of the sample event, trip blanks will remain with the samples collected and will be analyzed as appropriate. Trip blanks for liquid samples should be water free of constituents in question.

One field blank shall be prepared for every sampling event. Field blanks will be submitted for each parameter and treated in the exact same manner as the rest of the samples. Field blanks are needed to evaluate the potential for contamination during sampling. The field blank media will be transported to the field in clean or new containers with the proper labeling. The field blank bottles may be filled at any time in the field during the sampling process. At the end of the sample event, field blanks will remain with the samples collected and will be analyzed as appropriate. Field blanks for liquid samples should be water that is free of constituents in question. Trip and field blanks can be reduced if more than one media is sampled in a day.

In the event that non-dedicated sampling equipment is used, an equipment blank must be collected during the sampling event and analyzed for the parameters that are sampled for. An equipment blank will be collected by pouring deionized or distilled water over or through the sampling equipment and collecting the rinsate in the sample bottles.

6.3 Duplicate Samples

Field duplicate sampling will be completed as specified by the analytical method used. At a minimum, one field duplicate sample will be obtained for every twenty samples collected or for each week of sampling. Field duplicates can be reduced if these more than one media is sampled in a week.

7.0 Ambient Air Monitoring Program

The formal Ambient Air Monitoring Program that was approved in 2006 is included as Attachment F of this SAP.

7.1 Sampling Procedures

Ambient Air sampling will be completed according to the location, frequency, parameters, and analytical requirements specified in Table 2-A, Sampling Collection Chart and Table 2-B, Routine Chemical Constituent, Analytical Method, and Reporting Limit List.

8.0 Soil Monitoring Program

Surface soil at the landfill is monitored on an annual basis to evaluate potential for release to the surface soils of waste constituents from the facility. The Soil Monitoring Program includes guidelines for sampling and reporting the data. General procedures and guidelines for all sampling media are discussed in Section 2.0 General Procedures and Guidelines.

8.1 Sampling Procedures

Soil samples will be obtained according to the location, frequency, parameters and analytical requirements as specified in Table 2-A, Sample Collection Chart and Table 2-C, Routine Chemical Constituent, Analytical Method, and Reporting Limit List for Soil. Complete a field data sheet, as described in Section 2.2.

A composite of the top one inch of surface soil samples will be collected from fifteen equally proportioned, equidistant cores within the test soil box. Soils will be composited in a stainless steel bowl and homogenized by hand-mixing. All cores will be included in the composite to provide the sample for analysis. The cores will be obtained by moving around a three foot radius circle at fifteen inch intervals for a total of fifteen cores. A 'hoop' template will be used to indicate the spacing intervals around which the composite samples are collected. Soil samples will not be collected if the ground is frozen or during rain events.

8.2 Trip and Field Blanks

Trip blanks will be prepared by placing clean Ottawa sand in a clean sample bottle, prior to every sampling event. The trip blank will remain unopened throughout the sampling day. Trip blanks are used to evaluate the potential for contamination during equipment and sample transport. Sample bottles shall be prepared for all the parameters being sampled and the time they were prepared will be recorded on a field data sheet. Preservatives (if necessary) will be added at the time the bottles are filled, to prevent opening the bottles in the field. At the end of the sample event, trip blanks will

remain with the samples collected and will be analyzed as appropriate. Laboratory testing of Trip Blanks is optional, and may be conducted if unusual or unexpected results are obtained during laboratory testing of soil samples. Untested Trip Blanks will be discarded.

One field blank shall be prepared for every sampling event. Field blanks will be submitted for each parameter and treated in the exact same manner as the rest of the samples. Field blanks are needed to evaluate the potential for contamination during sampling. The field blank media will be transported to the field in clean or new containers with the proper labeling. The field blank bottles may be filled at any time in the field during the sampling process. Place a clean set of all the tools that would normally be used (spatula, core tool, tweezers, etc) into a clean compositing bowl. Pour Ottawa sand through a clean 0.25-inch sieve into a stainless steel compositing bowl, making sure the sand touches the tools in the bowl. Use a clean spoon to place sand into the clean bottle(s). At the end of the sample event, field blanks will remain with the samples collected and will be analyzed as appropriate. Trip and field blanks can be reduced if more than one media is sampled in a day.

8.3 Duplicate Samples

Field duplicate sampling will be completed as specified by the analytical method used. At a minimum, one field duplicate sample will be obtained for every twenty samples collected or for each week of sampling.

Table 1. Environmental Analytical Sample Collection Specification***Liquid Samples***

Parameter	Description	Bottle Size	Bottle Type ⁽¹⁾	Preservation	Holding Time	Number of bottles per sample point
VOA	Volatile Organic Analysis	40 mL	Glass Vial	.25 mL Sulfuric	14 days	*4
EOA	Extractable Organic Analysis	1 L	Amber Glass	None	7/40 Days (extract/analyze)	2
Pesticides	Pesticides Analysis	1 L	Amber Glass	Sodium Thiosulfate	7/40 Days (extract/analyze)	2
TOC	Total Organic Carbon	250 mL	Amber Glass	2 mL Sulfuric	28 Days	1
Carbs	Bicarbonate/Carbonate Analysis	120 mL	Amber Glass	None	14 days	1
Sulfide	Sulfide Analysis	250 or 500 mL	Amber Glass	ZnAC & NaOH	7 days	1
Cyan	Cyanide Analysis	500 mL	Clear Plastic	2 mL NaOH	14 days	1
Ammonia	Ammonia Analysis	500 mL	Clear Plastic	2 mL Sulfuric	28 Days	1
N/NO3	Nitrite/Nitrate Analysis	500 mL	Brown Plastic	2 mL Sulfuric	28 Days	1
Phenols	Phenols Analysis	500 mL	Amber Glass	2 mL Sulfuric	7 days	1
Phosphate	Total / Hydrolyzable Phosphate Orthophosphate	500 mL	Clear Plastic	2mL Sulfuric	28 Days	1
		500 mL	Clear Plastic	None	48 Hours	1
FL	Fluoride Analysis	500 mL	Clear Plastic	None	28 Days	1
Sulfate	Sulfate Analysis	500 mL	Clear Plastic	None	28 Days	1
Chlorides	Chloride Analysis	500 mL	Clear Plastic	None	28 Days	1
Metals	Inorganic Analysis	500 mL	Plastic Jar	2 mL Nitric	6 Months	1
TOX	Total Organic Hologens	500 mL	Amber Glass	Sodium Thiosulfate and Sulfuric Acid to a pH of <2	7 Days	*4
Turbidity	Turbidity Measurements	120 mL	Amber Glass	None	48 hours	1
D / F	**Dioxin / Fuans Analysis	4 Liter 1 Liter	Amber Glass Amber Glass	None	1 Year	2

Notes:

(1) Equivalent Bottles may be submitted.

*=With Zero Headspace

**=Consult with analysts before sampling

Table 1. Environmental Analytical Sample Collection Specification***Solid Samples***

Parameter	Description	Bottle Size	Bottle Type	Preservation	Holding Time	Number of bottles per sample point
D / F	***Dioxin / Furans Analysis for Ash or Soil	250 mL	Clear Glass (Wide-mouth)	None	1 Year	2
Metals	Inorganic Analysis	250 mL	Clear Glass (Wide-mouth)	None	6 Months	2
EOA	Extractable Organic Analysis	250 mL	Clear Glass (Wide-mouth)	None	14/40 Days (extract/analyze)	2
VOA	Volatile Organic Analysis	90 mL	Clear Glass (Septum Lid)	Methanol	14 Days	4
TCLP / VOA	TCLP for Volatiles	250 mL	Clear Glass (Wide-mouth)	None	14 Days	2
TCLP / Met	TCLP for Inorganics	250 mL	Clear Glass (Wide-mouth)	None	180 Days	2
TCLP / EOA	TCLP for Extractables	250 mL	Clear Glass (Wide-mouth)	None	14 Days	2

Notes:

***=Jars half full and threads wiped clean.

Field Measurements

The following measurements may be taken during any field sampling, following current and applicable SW-846 or ASTM Methods:

- Temperature
- pH
- Specific Conductance
- Turbidity
- Redox Potential
- Dissolved Oxygen

Table 2-A. Sample Collection Chart

Identifier	Site Information	Frequency	Field Param	Analysis Parameters	Specific Constituents	Who Samples	Miscellaneous	Data Evaluation/Response	Reporting
Salzburg Landfill Groundwater Wells Monitoring									
4829	Till Clay Well	Semi- Annual (2nd and 4th qtrs.)	pH, Temp, Cond & SWL	VOA, EOA, TOC, DISSOLVED METALS (filtered), ANIONS	See Table 2-B. Routine Chemical Constituent List Tracking Parameters: Sodium, Potassium, Iron, Magnesium, Calcium, Chloride, Bicarbonate (HCO ₃), Carbonate (CO ₃), Sulfate (SO ₄) (all metals dissolved) Routine Chemical Constituent List (Table 2-B) will be evaluated and updated every 5 years, based on the annual and every 5 year leachate analysis.	Dow Analytical or qualified alternate		<u>Evaluation:</u> Concentrations of VOAs and EOAs are compared to their respective RLs. Concentrations of Metals and Anions are statistically evaluated using upper tolerance limits (UTLs) (See Table 5). Tracking Parameters: Stiff diagrams or other geochemical graphical representations will be developed and reviewed annually. <u>Response:</u> If concentrations of VOAs or EOAs are less than the RL; and Metals and Anions are less than the UTL, in all wells, then the sample period is over. If the concentration of a constituent in any well is equal to or greater than the respective RL or UTL, then the following actions must take place: •Notify the Chief of the MDEQ, Waste and Hazardous Material Division (WHMD) in writing within 60 days of the sampling event; •Schedule and perform a confirmation resample of the well(s), for the constituent(s) in question, within 30 days of the notification, taking not less than 4 replicate samples; •If a constituent exceedance is confirmed (2 or more replicates at or above the RL or UTL or any of them more than 5 times the RL or UTL), notify the Chief of the MDEQ, WHMD in writing within 7 working days of the determination of the confirmed exceedance. <u>Develop Background Data:</u> UTLs will be developed for Metals and Anions without a UTL after a minimum of eight results have been collected to establish a background dataset.	Data and statistical analyses will be submitted within 60 days after the end of the quarter in which the sampling was conducted (in the Quarterly Monitoring Reports). An evaluation that includes a descriptive summary of tracking parameter testing results required by Condition IV.A.4.(f). Tracking Parameter results and/or Tracking Parameter trends for Wells 4832, 4833, 4834, over time will be specifically discussed to evaluate groundwater quality with respect to historic dust management at the facility in the Annual report. Hydraulic gradient evaluation and tracking parameter Stiff diagrams will be submitted in Annual report.
4830	Till Clay Well								
4831	Till Clay Well								
4832	Till Clay Well								
4833	Till Clay Well								
4834	Till Clay Well								
4836	Till Sand Well								
4837	Till Sand Well								
4838	Till Clay Well								
4839	Till Clay Well								
4840	Till Clay Well								
5949	Till Clay Well								
5780	Till Clay Well								
4666	Till Clay Well								
4667	Till Clay Well								
2708	Regional Aquifer Well								
3011	Regional Aquifer Well								
3013	Regional Aquifer Well								
5213	Till Clay Well								
5594	Till Clay Well								
3138	Regional Aquifer Well	Semi-Annual (2nd and 4th qtrs.)	SWL only					<u>Evaluation:</u> Used for hydraulic gradient evaluation only.	

Table 2-A. Sample Collection Chart

Identifier	Site Information	Frequency	Field Param	Analysis Parameters	Specific Constituents	Who Samples	Miscellaneous	Data Evaluation/Response	Reporting
Salzburg Landfill Leachate Monitoring									
Cell 1 - 5	Closed Hazardous Waste Cells/ Lift Station 2A	<u>Chemical Monitoring:</u> Active Cells - annually (dependant upon flow); Closed Cells - every 5 years beginning in 2010. <u>Flow volume checks:</u> Active Cells - monthly; Closed Cells - quarterly	pH, Temp, Cond	VOA, EOA, TOC, DISSOLVED METALS (filtered), ANIONS, dioxins and furans	40 CFR, Part 264, Appendix IX list; 17 International Toxic Equivalency Factor (ITEF) dioxin and furan isomers and total tetra- through octa- dioxin and furan congener groups	Dow Analytical or qualified alternate		Data will be used for the purposes of evaluating Table 2-B, Routine Chemical Constituent List for the Groundwater Monitoring, Leak Detection System Monitoring and Surface Water Monitoring programs.	All leachate data collected during the year will be submitted in the Annual report.
Cell 6 - 8	Closed Hazardous Waste Cells/ Lift Station 5								
Cell 9 - 10	Closed Hazardous Waste Cells/Lift Station 7								
Cell 11-12	Closed Hazardous Waste Cells/Lift Station 9								
Cell 13-14	Closed Hazardous Waste Cells/Lift Station 13								
Cell 15-16	Closed Hazardous Waste Cells/Lift Station 19								
Cell 17-19	Closed Hazardous Waste Cells/Lift Station 23								
Cell 20-22	Active Hazardous Waste Cells/ Lift Station 25								
Cell 38-39	Closed Non-Hazardous Cells/ Lift Station 38								
Cell 40-43	Closed Non-Hazardous Cells/ Lift Station 22								

Table 2-A. Sample Collection Chart

Identifier	Site Information	Frequency	Field Param	Analysis Parameters	Specific Constituents	Who Samples	Miscellaneous	Data Evaluation/Response	Reporting
Salzburg Landfill Leak Detection System (LDS) Monitoring									
Cell 1 - 5	Lift Station 3A	Quarterly, dependant upon flow	pH, Temp, Cond	VOA, EOA, TOC, DISSOLVED METALS (filtered), ANIONS	See Table 2-B. Routine Chemical Constituent List Routine Chemical Constituent List will be evaluated and updated based on the annual and every 5 year leachate analysis.	Dow Analytical or qualified alternate		<u>Evaluation:</u> Concentrations of VOAs and EOAs are compared to their RLs. Concentrations of Metals and Anions are statistically evaluated using upper tolerance limits (UTLs). <u>Response:</u> If concentrations of VOAs or EOAs are less than the RL; and Metals and Anions are less than the UTL, in all samples, then the sample period is over. If the concentration of any constituent is equal to or greater than the respective RL or UTL, then the following actions must be taken: <ul style="list-style-type: none"> •Notify the Chief of the MDEQ, WHMD in writing within 60 days of the sampling event; •Schedule and perform a confirmation resample of the cell(s), for the constituent(s) in question, within 30 days of the notification, taking not less than 4 replicate samples; •If a constituent exceedance is confirmed (2 or more replicates at or above the RL or UTL or any of them more than 5 times the RL or UTL), notify the Chief of the MDEQ, WHMD in writing within 7 working days of the determination of the confirmed exceedance. •Determine whether a failure in the liner system has occurred or if the exceedance has a source other than the liner. •If a failure has occurred, do either of the following: - Repair the failure and obtain certification from the MDEQ, WHMD. - Cease placing waste in the failed unit and take corrective action. Develop Background Data: UTLs will be developed for Metals and Anions after a minimum of eight results have been collected to establish a background dataset.	Data will be submitted within 60 days after the end of the quarter in which samples were analyzed (in the Quarterly Monitoring Report).
Cell 6 - 8	Lift Station 6								
Cell 9 - 10	Lift Station 8								
Cell 11-12	Lift Station 11								
Cell 13-14	Lift Station 12								
Cell 15-16	Lift Station 20								
Cell 17-19	Lift Station 21								
Cell 20-22	Active Cells/ Lift Station 26	Quarterly dependant on flow; monitored monthly for water volumes. Chemical monitoring frequency will be increased to monthly if volume exceeding the design specifications is observed.	pH, Temp, Cond	VOA, EOA, TOC, DISSOLVED METALS (filtered), ANIONS, DIOXINS AND FURANS	40 CFR, Part 264, Appendix IX list; 17 International Toxic Equivalency Factor (ITEF) dioxin and furan isomers and total tetra- through octa- dioxin and furan congener groups	Dow Analytical or qualified alternate		Baseline will be established for new cells by collecting 4 samples prior to the placement of waste in the cell.	
Future Cells		Eight samples collected prior to placing waste in the cell.							

Table 2-A. Sample Collection Chart

Identifier	Site Information	Frequency	Field Param	Analysis Parameters	Specific Constituents	Who Samples	Miscellaneous	Data Evaluation/Response	Reporting
Salzburg Landfill Surface Water Monitoring									
001-B	Ditch Water	Quarterly, dependant upon rainfall	pH, Temp, Cond	TOC, TOTAL METALS (unfiltered), ANIONS	See Metals and Anions section of Table 2-B. Routine Chemical Constituent List Routine Chemical Constituent List will be evaluated and updated based on the annual and every 5 year leachate analysis.	Dow Analytical or qualified alternate		<u>Evaluation:</u> Duplicate samples shall be collected on a basis from each sampling location. Initially, analyze only one of the two samples, and hold the duplicate sample pending the results of the initial sample. Results compared to baseline data and reviewed for increasing trends or significant changes. An increasing trend is defined as 5 consecutively increasing detections resulting in a net change of greater than 2 standard deviations. A significant change is defined as a one-time increase of an order of magnitude over the background average would also trigger a response. If a statistically significant increase is detected in a monitoring parameter(s), the duplicate sample shall be analyzed for confirmation purposes. <u>Response:</u> If an increasing trend or significant change is confirmed, notify MDEQ within one business day and in writing within seven days. Within 30 days of the determination of an increasing trend or significant change determine whether a discharge to surface waters is occurring, determine the source, and take immediate steps to eliminate and prevent a	Data and trend charts will be submitted within 60 days after the end of the quarter in which the sampling was conducted (in the Quarterly Monitoring Report).
001-D	Ditch Water								
001-E	Ditch Water								

Table 2-A. Sample Collection Chart

Table 2-1: Sample Collection Data									
Identifier	Site Information	Frequency	Field Param	Analysis Parameters	Specific Constituents	Who Samples	Miscellaneous	Data Evaluation/Response	Reporting
Salzburg Landfill Ambient Air Monitoring									
914	Air Monitoring Station	Every 6 days	Total Solids Particulate (TSP)	NONE	NONE	Dow Analytical or qualified alternate		<u>Evaluation:</u> Results compared to National Ambient Air Quality Standard Limits to ensure results are within acceptable concentrations.	Data will be summarized and submitted within 60 days after the end of the quarter in which the samples were analyzed, to the Air Quality Division (placeholder in the Quarterly Monitoring Report which is submitted to the Chief of WHMD).
917	Air Monitoring Station								
918	Air Monitoring Station								
Salzburg Landfill Soil Monitoring									
SLFSB-01	Soil Box	Annually	DIOXINS AND FURANS	17 International Toxic Equivalency Factor (ITEF) dioxin and furan isomers and total tetra- through octa-dioxin and furan congener groups	See Table 2-C. Routine Chemical Constituent List for Soil Monitoring	Dow Analytical or qualified alternate		<u>Evaluation:</u> Graphical interpretation of data through SQC methods, including constructing a control chart for each location, plotting the annual data in a time-series graph, and using "rules of thumb" to compare the new concentrations to baseline conditions. Statistical methods will be consistent with those defined in the Soil Box and Greenbelt Data Evaluation Plan, dated November 23, 2005.	Data will be submitted within 60 days after the end of the quarter in which samples were analyzed (in the Quarterly Monitoring Report).
SLFSB-02	Soil Box								
SLFSB-03	Soil Box								

**Table 2-B. Routine Chemical Constituent List
for Groundwater Protection and Leak Detection System Monitoring ¹**

Volatile Organics		
	Acetone	2-Hexanone
	Acetonitrile; Methyl cyanide	Isobutyl alcohol
	Benzene	Methyl chloride; Chloromethane
	Bromochloromethane	Methylene bromide; Dibromomethane
	Carbon tetrachloride	Methylene chloride; Dichloromethane
	Chlorobenzene	Methyl ethyl ketone; MEK
	Chloroform	4-Methyl-2-pentanone; Methyl isobutyl ketone
	1,2-Dibromoethane; Ethylene dibromide	Styrene
	m-Dichlorobenzene	1,1,2,2-Tetrachloroethane
	o-Dichlorobenzene	Tetrachloroethylene; Tetrachloroethene
	p-Dichlorobenzene	Toluene
	1,1-Dichloroethane	1,1,1-Trichloroethane; Methylchloroform
	1,2-Dichloroethane; Ethylene dichloride	Trichloroethylene; Trichloroethene
	1,1-Dichloroethylene; Vinylidene chloride	Trichlorofluoromethane
	trans-1,2-Dichloroethylene	Vinyl chloride
	1,2-Dichloropropane	o-Xylene
	Cis-1,3-Dichloropropene	m-Xylene
	1,4-Dioxane	p-Xylene
	Ethylbenzene	

Semi-volatile Organics		
	Aniline	Hexachlorophene
	Benzyl alcohol	o-Nitrophenol
	2-Chlorophenol	Pentachlorophenol
	3-Chlorophenol	2-Picoline
	p-Chloro-m-cresol	2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid
	o-Cresol	2,3,4,6-Tetrachlorophenol
	m-Cresol	1,2,4-Trichlorobenzene
	p-Cresol	2,4,5-Trichlorophenol
	2,4-D; 2,4-Dichlorophenoxyacetic acid	2,4,6-Trichlorophenol
	o-Dichlorobenzene	Naphthalene
	p-Dichlorobenzene	4-Nitroquinoline 1-oxide
	2,4-Dichlorophenol	Phenol
	2,6-Dichlorophenol	Phorate
	Diethyl phthalate	Pyridine
	Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	Silvex; 2,4,5-TP
	Hexachlorobenzene	Bis (2-chloroisopropyl) ether

Metals and Anions ²		
	Cobalt	Vanadium
	Copper	Cyanide
	Selenium	

¹ Refer to Attachment B for analytical methods and reporting limits.

² Surface Water Monitoring includes only Metals and Anions analysis.

**Table 2-C. Routine Chemical Constituent List
for Soil Monitoring¹**

Common Name²

2378-TCDD
Total TCDD
12378-PeDD
Total PeCDD
123478-HxCDD
123678-HxCDD
123789-HxCDD
Total HxCDD
1234678-HpCDD
Total HpCDD
OCDD
2378-TCDF
Total TCDF
12378-PeCDF
23478-PeCDF
Total PeCDF
123478-HxCDF
123678-HxCDF
234678-HxCDF
123789-HxCDF
Total HxCDF
1234678-HpCDF
1234789-HpCDF
Total HpCDF
OCDF

¹ Refer to Attachment B for analytical method and reporting limits.

² This category contains congener chemicals, including tetrachlorodibenzofurans, pentachlorodibenzofurans, and hexachlorodibenzofurans.

Table 3. Well Purging Information

	Identifier	Pump Type	Purge Method	Containerize Purge Water?	Min. Volume	Equipment Needs
Glacial Till and Regional Aquifer Detection Monitoring						
	4829	submersible centrifugal	fixed volume	no	3 well volumes or dryness	controller; generator; SWL meter
	4830					
	4831					
	4832					
	4833					
	4834					
	4836					
	4837					
	4838					
	4839					
	4840					
	5949					
	5780					
	4666					
	4667					
	5213					
	3011					
	3013					
	5594					
	2708					

Table 4. Monitoring Well Specifications

Well ID	X	Y	¹ Casing Elevation	Top of Screen Elevation	Bottom Elevation	Well Depth	Formation Monitored
4829	6924.5	-6355.4	625.69	577.2	581.7	44.0	Till Clay
4830	6629.7	-6499.8	625.14	578.3	582.1	43.0	Till Clay
4831	6744.1	-7124.6	627.09	591.3	594.6	32.5	Till Clay
4832	7009.6	-7097.0	627.38	591.5	595.0	32.4	Till Clay
4833	7738.3	-8144.8	625.84	578.6	581.8	44.0	Till Clay
4834	8347.0	-8673.1	625.38	577.5	581.4	44.0	Till Clay
4836	9154.8	-8402.0	627.12	560.2	564.1	63.0	Till Sand
4837	9221.0	-7998.6	630.46	558.7	562.5	68.0	Till Sand
4838	9274.3	-7400.1	630.99	584.0	588.0	43.0	Till Clay
4839	9279.0	-6717.1	629.33	582.2	586.3	43.0	Till Clay
4840	8278.8	-6290.5	631.00	583.1	587.0	44.0	Till Clay
5949	9078.7	-6288.8	628.53	565.0	557.9	70.6	Till Clay
5780	7935.3	-6286.5	628.81	566.3	558.8	70.0	Till Clay
4666	7716.0	-6285.2	628.27	556.3	558.3	70.0	Till Sand
4667	7243.5	-6304.2	623.54	550.5	553.5	70.0	Till Clay
5213	8785.3	-8829.1	624.24	577.1	581.2	43.0	Till Clay
3011	9272.9	-6461.8	627.32	507.3	502.3	125.0	Regional Aquifer
3013	4964.7	-6842.8	623.83	433.8	427.6	196.2	Regional Aquifer
5594	8231.2	-8336.5	625.09	576.6	576.6	48.5	Till Clay
2708	6273.9	-6631.3	625.58	485.6	482.6	143.0	Regional Aquifer
3138	9341.6	-2205.4	641.84	417.0	412.0	227.0	Regional Aquifer

¹ Well Casings surveyed by Wade-Trim on 11/23/04, 12/17/04, and 12/20/04.

Table 5. Statistics for Groundwater Wells

Well		2708	3011	3013	4666	4667	4829	4830	4831	4832	4833
pH											
sample size	#	37	36	10	30	30	60	60	55	65	64
minimum	#	7.04	7.04	6.59	6.4	6.93	6.67	6.6	6.37	6.35	6.54
maximum	#	8.2	8.27	8.96	8.2	8.06	8.8	8.9	9.2	9.2	8.5
% non detect	%	0	0	0	0	0	0	0	0	0	0
parametric	yes or no	yes	yes	yes	no	yes	yes (Lognormal)	yes (Lognormal)	no	yes	no
95% UTL	#	8.260736	8.343124	9.564422	8.2	8.236864	8.355892	8.48006	9.2	8.854572	8.5
UTL Coverage	%	95	95	95	90.49661	95	95	95	94.69889	95	95.42703
specific conductance											
sample size	#	37	35	10	30	30	65	64	53	68	68
minimum	#	1460	1030	1402	460	400	495	465	333	250	731
maximum	#	1970	1430	1945	833	602	1400	1350	3770	1780	2030
% non detect	%	0	0	0	0	0	0	0	0	0	0
parametric	yes or no	no	no	yes	yes (Lognormal)	yes	yes	yes	no	yes	yes
95% UTL	#	1970	1430	2264.817	790.7544	596.278	1432.982	1349.177	3770	1662.973	1918.125
UTL Coverage	%	92.22253	91.79684	95	95	95	95	95	94.50445	95	95
selenium											
sample size	#						12	12	12	12	12
minimum	#						0.0005	0.0005	0.0005	0.0005	0.0005
maximum	#						0.0005	0.0005	0.0005	0.0005	0.0005
% non detect	%						100	100	100	100	100
parametric	yes or no						no (All ND)	no (All ND)	no (All ND)	no (All ND)	no (All ND)
95% UTL	#						NA	NA	NA	NA	NA
UTL Coverage	%						NA	NA	NA	NA	NA
copper											
sample size	#	37	36	9	29	30	49	50	46	51	51
minimum	#	0.00025	0.00025	0.00025	0.00025	0.0001	0.00025	0.00025	0.00012	0.00025	0.00025
maximum	#	0.006	0.005	0.0011	0.011	0.008	0.02	0.02	0.044	0.02	0.02
% non detect	%	75.67568	80.55556	88.88889	58.62069	46.66667	67.34694	70	56.52174	64.70588	60.78431
parametric	yes or no	no	no	NA?	no	yes (Lognormal)	no	no	no	no	no
95% UTL	#	0.006	0.004	NA	0.011	0.017059	0.01	0.011	0.044	0.013	0.013
UTL Coverage	%	92.22253	92.01535	NA	90.18554	95	94.0694	94.18449	93.69507	94.2952	94.2952

Table 5. Statistics for Groundwater Wells

Well		4834	4836	4837	4838	4839	4840	5213	5594	5780	5949
pn											
sample size	#	63	60	57	51	51	52	28	6	14	10
minimum	#	6.29	6.74	7.09	6.77	6.93	7.29	6.88	7.81	7.21	6.88
maximum	#	8.4	8.7	9.5	9.5	8.9	9	8.14	8.66	8.7	8.02
% non detect	%	0	0	0	0	0	0	0	0	0	0
parametric	yes or no	no	yes	yes	yes	yes	yes	no	NA?	yes	yes
95% UTL	#	8.4	8.641717	9.055704	9.460622	8.979015	9.076408	8.14	NA	8.838219	8.670206
UTL Coverage	%	95.35615	95	95	95	95	95	89.85343	NA	95	95
specific conductance											
sample size	#	66	65	63	51	51	52	26	6	14	10
minimum	#	1280	1340	1370	350	330	310	1150	1044	356	905
maximum	#	2180	2350	2290	614	528	580	1777	1144	760	1173
% non detect	%	0	0	0	0	0	0	0	0	0	0
parametric	yes or no	yes	no	yes	yes	yes	yes	no	NA?	no	no
95% UTL	#	2199.382	2350	2251.901	583.9757	502.4796	525.8139	1777	NA	760	1173
UTL Coverage	%	95	95.49577	95	95	95	95	89.11696	NA	80.73638	74.11344
selenium											
sample size	#	12	12	12	12	12	12				
minimum	#	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005				
maximum	#	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005				
% non detect	%	100	100	100	100	100	100				
parametric	yes or no	no (All ND)	no (All ND)	no (All ND)	no (All ND)	no (All ND)	no (All ND)				
95% UTL	#	NA	NA	NA	NA	NA	NA				
UTL Coverage	%	NA	NA	NA	NA	NA	NA				
copper											
sample size	#	52	49	48	47	49	48	25	5	13	10
minimum	#	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
maximum	#	0.015	0.015	0.015	0.015	0.015	0.015	0.01	0.00025	0.0011	0.0014
% non detect	%	65.38462	67.34694	72.91667	85.10638	91.83673	95.83333	36	100	61.53846	40
parametric	yes or no	no	no	no	NA?	NA?	NA?	yes (Lognormal)	NA?	no	no
95% UTL	#	0.01	0.0073	0.008	NA	NA	NA	0.019612	NA	0.0011	0.0014
UTL Coverage	%	94.40178	94.0694	93.94966	NA	NA	NA	95	NA	79.41833	74.11344

Note: Secondary constituents that do not have established UTLs did not have sufficient background data to do so. UTLs will be established upon collection of a sufficient number of data points.

Table 6. Statistics for Surface Water

Analyte	Site	Sample Size	Units	Coefficient of Variation	Standard Deviation	Mean	Median	Upper Quartile	Lower Quartile	Minimum	Maximum	% Nondetect	Distribution Determination
Bicarbonate Alkalinity	001-B	9	ug/L	0.467373	90592.49	193833.3	216000	227000	162000	2500	301000	11.11111	Normal
Bicarbonate Alkalinity	001-D	9	ug/L	0.435488	47497.18	109066.7	107000	143000	95200	2500	160000	11.11111	Normal
Bicarbonate Alkalinity	001-E	9	ug/L	0.622085	85965.22	138188.9	126000	196000	78100	2500	290000	11.11111	Normal
Carbonate Alkalinity	001-B	9	ug/L	2.644737	55833.33	21111.11	2500	2500	2500	2500	170000	88.88889	<15% Detected
Carbonate Alkalinity	001-D	9	ug/L	2.268689	23266.67	10255.56	2500	2500	2500	2500	72300	88.88889	<15% Detected
Carbonate Alkalinity	001-E	9	ug/L	2.405286	30333.33	12611.11	2500	2500	2500	2500	93500	88.88889	<15% Detected
Carbonate/ Bicarbonates	001-B	61	ug/L	7.560119	21754735	2877565	65000	180000	120	12	1.70E+08	0	Nonparametric
Carbonate/ Bicarbonates	001-D	55	ug/L	7.173731	20213874	2817763	70000	150000	150	16	1.50E+08	1.818182	Nonparametric
Carbonate/ Bicarbonates	001-E	62	ug/L	7.204024	12682332	1760451	84500	280000	140	17	1.00E+08	0	Nonparametric
Total Organic Carbon	001-B	70	ug/L	7.167473	357775.7	49916.58	9000	13000	12	0.5	3000000	1.428571	Nonparametric
Total Organic Carbon	001-D	64	ug/L	6.15532	199197.5	32361.85	7000	13000	18	0.5	1600000	1.5625	Nonparametric
Total Organic Carbon	001-E	71	ug/L	6.692072	212951.7	31821.49	5200	12000	12	0.5	1800000	2.816901	Nonparametric
cobalt	001-B												
cobalt	001-D												
cobalt	001-E												
copper	001-B												
copper	001-D												
copper	001-E												
selenium	001-B												
selenium	001-D												
selenium	001-E												
cyanide	001-B												
cyanide	001-D												
cyanide	001-E												
vanadium	001-B												
vanadium	001-D												
vanadium	001-E												

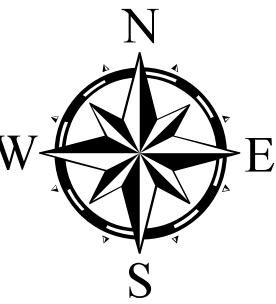
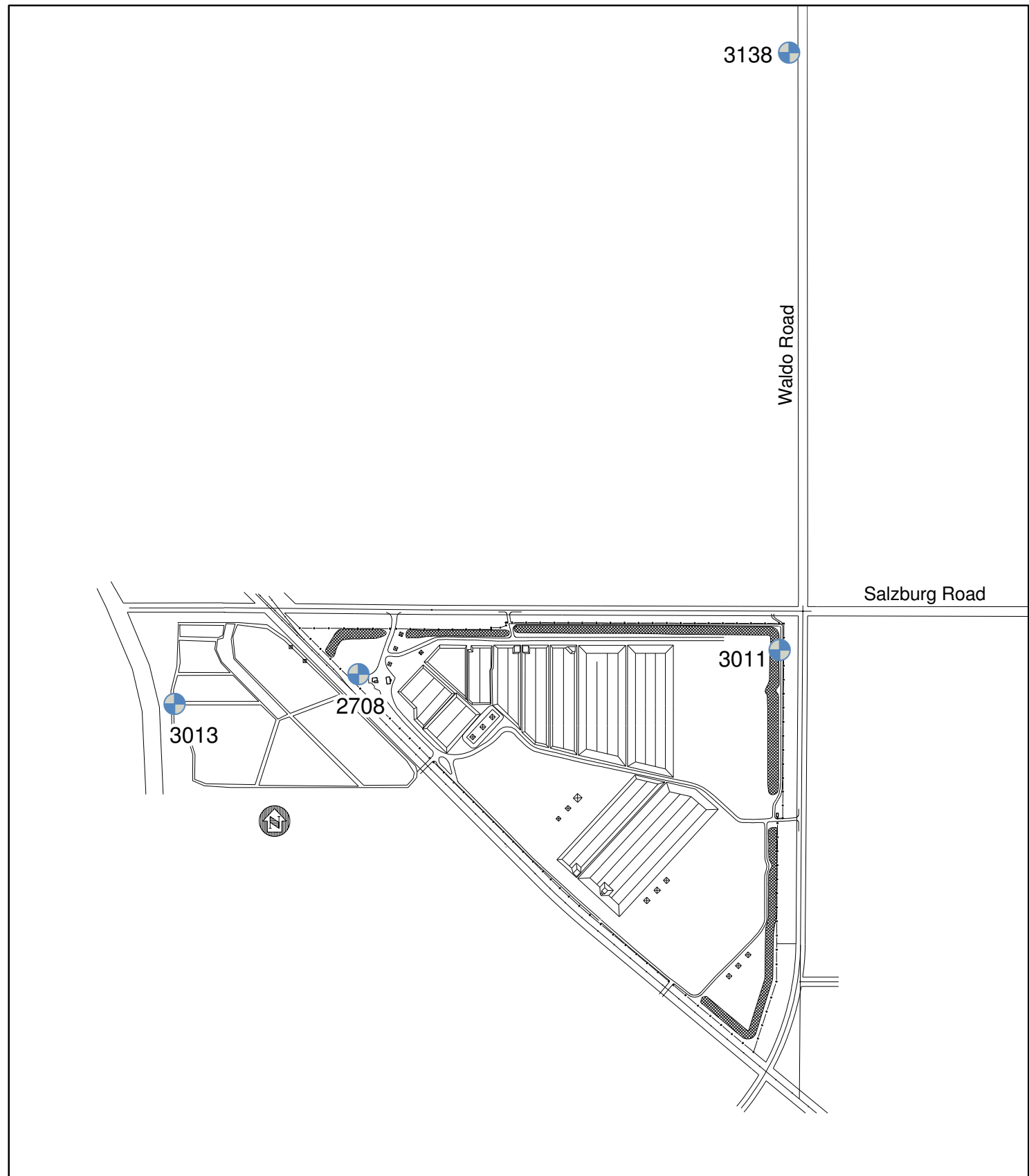
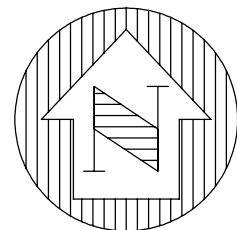
Table 7. Inspection Schedule for Environmental Monitoring Programs

Inspected Item	Frequency	Inspection Items
<u>Monitoring Wells:</u>	<u>Inspect when sampled:</u>	Intact (not bent or broken) No excessive silting No pooling around base Secured/Labeled Pump operational (if present)
<u>Piezometers:</u>	<u>Inspect when measured:</u>	Intact (not bent or broken) No excessive silting No pooling around base Secured/Labeled
<u>Purge Wells:</u>	<u>Inspect when monitored:</u>	Well intact Pump operational Maintaining adequate purge rates

All findings should be documented on the Field Data Sheet (see Attachment G).

Table 8. Record of SAP Revisions

Revision Date	Revision Number	Summary Description of Revision	Approval Date



THE DOW CHEMICAL COMPANY
MICHIGAN OPERATIONS
MIDLAND, MICHIGAN

URS

DRAWN: M. CROOK	DATE: 01/09/2006
REVIEW: K. COSAN	DATE: 01/09/2006
REVISION:	DATE:
REVISION:	DATE:
REVISION:	DATE:
REVISION:	DATE:
ISSUED:	DATE:
ISSUED:	DATE:
ISSUED:	DATE:
ISSUED:	DATE:

LEGEND:	AIR MONITORING LOCATIONS
	GROUNDWATER MONITORING WELL
	LEACHATE COLLECTION LOCATION
	LINER FAILURE DETECTION LOCATION
	SURFACE WATER OUTFALLS
	SOIL BOX LOCATION
	UTILITY TOWER
	PERIMETER BERM
	PERIMETER FENCE
	RAIL LINES
LANDFILL CELL TYPE	
	HAZARDOUS
	NON-HAZARDOUS
DRAWING SCALE:	0 200 400 800 FEET 1:2,263

SALZBURG LANDFILL
ENVIRONMENTAL MONITORING PLAN

Attachment A

Analytical Procedures and Quality Control

ANALYTICAL PROCEDURES

Samples taken in support of Part 111 of Act 451/RCRA requirements will be analyzed by The Dow Chemical Company (Dow). The Dow Analytical Sciences Laboratories will maintain quality control and good laboratory practices. Solvents, calibration standards, and calibration gases are analytical reagent grade or better and carrier gases are of high purity. All instruments are standardized or calibrated according to the appropriate method. Documentation is kept of instrument calibration and any instrument repair. All transportation, storage, and waste disposal at Dow's Analytical Science Laboratories will be done in accordance with applicable state and federal regulations. Reporting limits stated in Appendix B are for the Part 111 of Act 451/RCRA detection monitoring program. At the discretion of the Analytical Sciences Laboratories management, a Dow analytical facility or an outside contractor may be used to perform any analyses. Analytical Science Laboratories will assure that the outside laboratory chosen will be able to meet reporting limits as identified in Appendix B.

Samples are analyzed in accordance to EPA methods as presented in Appendix B to the SAP. Best laboratory practices will be utilized where an EPA method does not mandate. Laboratory procedures are reviewed and updated periodically. If review reveals that changes have been made in analytical methods, this information will be sent to MDEQ. Dow will submit proposed revisions to the SAP to the Chief of the Waste and Hazardous Materials Division for approval prior to implementation and will revise any other affected document accordingly. If approved, the revisions to the SAP will become part of the license without the need for a minor license modification.

Reporting limits are meant to represent typical limits achievable for clean water samples. Matrix interferences may prevent these levels from being met for some analyses. These limits are meant to be a representation of laboratory capability and may not be used for reporting purposes.

QUALITY CONTROL

Blanks are analyzed as described in the tables below as a quality control check. The purpose of the checks is to detect sampling or laboratory contamination. A complete description of the quality assurance and quality control policies and procedures followed by the laboratory is provided in Appendix C to the SAP.

Parameter	Trip Blank	Field Blank	Lab Blank
Volatile Organics	Optional for each daily sample event	One for each daily sample event	One for each 12-hour analytical batch
Semivolatile Organics	Optional for each daily sample event	One for each daily sample event	One for each set of 20 or fewer samples
Inorganics	Optional for each daily sample event	One for each daily sample event	One per each daily sample event (anions) One per each set of ten samples (metals)
Trace Analysis	Optional for each daily sample event	One for each daily sample event	One for each set of 20 samples

Attachment B

Chemical Constituent, Analytical Method, and Reporting Limit List

Attachment BChemical Constituent, Analytical Method, and Reporting Limit List

Table I – Volatile Organics	Page 1
Table II – Semivolatile Organics	4
Table III – Metals	10
Table IV – Anions	11
Table V – Other Constituents	12

Notes:

(1) A Reporting Limit (RL) is defined as the lowest level at which measurements become quantitatively meaningful. An RL is greater than the statistically determined MDLs.

(2) Methods stated in this Appendix can change and will be updated to reflect the most recently approved EPA version.

(3) 1,4-Dioxane lower RL applies only to Glacial Till and Regional Aquifer detection monitoring wells. *

(4) Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals, including constituents of Aroclor-1016 (CAS RN 12674-11-2), Aroclor-1221 (CAS RN 11104-28-2), Aroclor-1232 (CAS RN 11141-16-5), Aroclor-1242 (CAS RN 53469-21-9), Aroclor-1248 (CAS RN 12672-29-6), Aroclor-1254 (CAS RN 11097-69-1), Aroclor-1260 (CAS RN 11096-82-5). The RL shown is an average value for PCB congeners.

(5) RLs for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans are in pg/g or ng/L depending on the matrix. The first RL is for soil samples and the second RL is for water samples.

* Note refers to Michigan Operations, Operating License Glacial Till and Regional Aquifer Monitoring Program. This reference is included in an effort to standardize the Chemical Constituent, Analytical Method, and Reporting Limit List between the Michigan Operations Sampling and Analysis Plan and the Salzburg Landfill Sampling and Analysis Plan.

Table I
Volatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
Acetone.....	67-64-1	2-Propanone.....	8260B	25
Acetonitrile; Methyl cyanide.....	75-05-8	Acetonitrile.....	8260B	10
Acrolein.....	107-02-8	2-Propenal.....	8260B	5
Acrylonitrile.....	107-13-1	2-Propenenitrile.....	8260B	5
Allyl chloride.....	107-05-1	1-Propene, 3-chloro-.....	8260B	1
Benzene.....	71-43-2	Benzene.....	8260B	1
Bromochloromethane.....	74-97-5	Methane, bromochloro-.....	8260B	1
Bromodichloromethane.....	75-27-4	Methane, bromodichloro-.....	8260B	1
Bromoform; Tribromomethane.....	75-25-2	Methane, tribromo-.....	8260B	1
Carbon disulfide.....	75-15-0	Carbon disulfide.....	8260B	5
Carbon tetrachloride.....	56-23-5	Methane, tetrachloro-.....	8260B	1
Chlorobenzene.....	108-90-7	Benzene, chloro-.....	8260B	1
Chloroethane; Ethyl chloride.....	75-00-3	Ethane, chloro-.....	8260B	5
Chloroform.....	67-66-3	Methane, trichloro-.....	8260B	1
Chloroprene.....	126-99-8	1,3-Butadiene, 2-chloro-.....	8260B	5
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-.....	8260B	1
1,2-Dibromo-3-chloropropane; DBCP.....	96-12-8	Propane, 1,2-dibromo-3-chloro-.	8260B	5
1,2-Dibromoethane; Ethylene dibromide...	106-93-4	Ethane, 1,2-dibromo-.....	8260B	1
o-Dichlorobenzene.....	95-50-1	Benzene, 1,2-dichloro-.....	8260B	1
m-Dichlorobenzene.....	541-73-1	Benzene, 1,3-dichloro-.....	8260B	1
p-Dichlorobenzene.....	106-46-7	Benzene, 1,4-dichloro-.....	8260B	1
trans-1,4-Dichloro-2-butene.....	110-57-6	2-Butene, 1,4-dichloro-, (E)-..	8260B	1
Dichlorodifluoromethane.....	75-71-8	Methane, dichlorodifluoro-.....	8260B	5
1,1-Dichloroethane.....	75-34-3	Ethane, 1,1-dichloro-.....	8260B	1
1,2-Dichloroethane; Ethylene dichloride.	107-06-2	Ethane, 1,2-dichloro-.....	8260B	1
1,1-Dichloroethylene; Vinylidene chloride.	75-35-4	Ethene, 1,1-dichloro-.....	8260B	1
cis-1,2-Dichloroethylene.....	156-59-3	Ethene, 1,2-dichloro-, (Z)-....	8260B	1
trans-1,2-Dichloroethylene.....	156-60-5	Ethene, 1,2-dichloro-, (E)-....	8260B	1
1,2-Dichloropropane.....	78-87-5	Propane, 1,2-dichloro-.....	8260B	1

Table I (Continued)
Volatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
cis-1,3-Dichloropropene.....	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-.	8260B	1
trans-1,3-Dichloropropene.....	10061-02-6	1-Propene, 1,3-dichloro-, (E)-.	8260B	1
1,4-Dioxane.....	123-91-1	1,4-Dioxane.....	8260B	40/20 (See Note 3)
Ethylbenzene.....	100-41-4	Benzene, ethyl-.....	8260B	1
Ethyl methacrylate.....	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester.	8260B	1
2-Hexanone.....	591-78-6	2-Hexanone.....	8260B	5
Isobutyl alcohol.....	78-83-1	1-Propanol, 2-methyl-.....	8260B	10
Isopropylbenzene.....	98-82-8	.....	8260B	1
Methacrylonitrile.....	126-98-7	2-Propenenitrile, 2-methyl-....	8260B	5
Methyl bromide; Bromomethane.....	74-83-9	Methane, bromo-.....	8260B	5
Methyl chloride; Chloromethane.....	74-87-3	Methane, chloro-.....	8260B	5
Methylene bromide; Dibromomethane.....	74-95-3	Methane, dibromo-.....	8260B	1
Methylene chloride; Dichloromethane.....	75-09-2	Methane, dichloro-.....	8260B	5
Methyl ethyl ketone; MEK.....	78-93-3	2-Butanone.....	8260B	5
Methyl iodide; Iodomethane.....	74-88-4	Methane, iodo-.....	8260B	1
Methyl methacrylate.....	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester.	8260B	5
4-Methyl-2-pentanone; Methyl isobutyl ketone.	108-10-1	2-Pentanone, 4-methyl-.....	8260B	5
Pentachloroethane.....	76-01-7	Ethane, pentachloro-.....	8260B	1
Propionitrile; Ethyl cyanide.....	107-12-0	Propanenitrile.....	8260B	5
n-Propylbenzene.....	103-65-1	.....	8260B	1
Styrene.....	100-42-5	Benzene, ethenyl-.....	8260B	1
1,1,1,2-Tetrachloroethane.....	630-20-6	Ethane, 1,1,1,2-tetrachloro-...	8260B	1
1,1,2,2-Tetrachloroethane.....	79-34-5	Ethane, 1,1,2,2-tetrachloro-...	8260B	1
Tetrachloroethylene; Perchloroethylene; Tetrachloroethene.	127-18-4	Ethene, tetrachloro-.....	8260B	1
Toluene.....	108-88-3	Benzene, methyl-.....	8260B	1
1,1,1-Trichloroethane; Methylchloroform.	71-55-6	Ethane, 1,1,1-trichloro-.....	8260B	1

Table I (Continued)
Volatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
1,1,2-Trichloroethane.....	79-00-5	Ethane, 1,1,2-trichloro-.....	8260B	1
Trichloroethylene; Trichloroethene.....	79-01-6	Ethene, trichloro-.....	8260B	1
Trichlorofluoromethane.....	75-69-4	Methane, trichlorofluoro-.....	8260B	1
1,2,3-Trichloropropane.....	96-18-4	Propane, 1,2,3-trichloro-.....	8260B	1
Vinyl acetate.....	108-05-4	Acetic acid, ethenyl ester.....	8260B	5
Vinyl chloride.....	75-01-4	Ethene, chloro-.....	8260B	1
o-Xylene.....	95-47-6	Benzene, 1,2-dimethyl-.....	8260B	1
m-Xylene.....	108-38-3	Benzene, 1,3-dimethyl-.....	8260B	2
p-Xylene.....	106-42-3	Benzene, 1,4-dimethyl-.....	8260B	2

Table II
Semivolatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
Acenaphthene.....	83-32-9	Acenaphthylene, 1,2-dihydro-...	8270C	1
Acenaphthylene.....	208-96-8	Acenaphthylene.....	8270C	1
Acetophenone.....	98-86-2	Ethanone, 1-phenyl-.....	8270C	10
2-Acetylaminofluorene; 2-AAF.....	53-96-3	Acetamide, N-9H-fluoren-2-yl-..	8270C	10
4-Aminobiphenyl.....	92-67-1	[1,1'-Biphenyl]- 4-amine.....	8270C	10
Aniline.....	62-53-3	Benzenamine.....	8270C	4
Anthracene.....	120-12-7	Anthracene.....	8270C	1
Aramite.....	140-57-8	Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester.	8270C	10
Benzo[a]anthracene; Benzanthracene.....	56-55-3	Benz[a]anthracene.....	8270C	1
Benzo[b]fluoranthene.....	205-99-2	Benz[e]acephenanthrylene.....	8270C	2
Benzo[k]fluoranthene.....	207-08-9	Benzo[k]fluoranthene.....	8270C	2
Benzo[ghi]perylene.....	191-24-2	Benzo[ghi]perylene.....	8270C	2
Benzo[a]pyrene.....	50-32-8	Benzo[a]pyrene.....	8270C	2
Benzoic acid.....	65-85-0	Benzoic acid.....	8270C	10
Benzyl alcohol.....	100-51-6	Benzenemethanol.....	8270C	20
Bis(2-chloroethoxy)methane.....	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis [2-chloro-.	8270C	2
Bis(2-chloroethyl)ether.....	111-44-4	Ethane, 1,1'-oxybis[2-chloro-..	8270C	1
Bis(2-chloro-1-methylethyl) ether; 2,2'-Di- chlorodiisopropyl ether.	108-60-1	Propane, 2,2'-oxybis[1-chloro-.	8270C	10
Bis(2-ethylhexyl) phthalate.....	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester.	8270C	2
4-Bromophenyl phenyl ether.....	101-55-3	Benzene, 1-bromo-4-phenoxy-....	8270C	2
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester.	8270C	1
p-Chloroaniline.....	106-47-8	Benzenamine, 4-chloro-.....	8270C	20
Chlorobenzilate.....	510-15-6	Benzeneacetic acid, 4-chloro- α -(4-chlorophenyl)- α -hydroxy-, ethyl ester.	8270C	10
p-Chloro-m-cresol.....	59-50-7	Phenol, 4-chloro-3-methyl-.....	8270C	10
2-Chloronaphthalene.....	91-58-7	Naphthalene, 2-chloro-.....	8270C	2
2-Chlorophenol.....	95-57-8	Phenol, 2-chloro-.....	8270C	10

Table II (Continued)
Semivolatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
3-Chlorophenol.....	108-43-0	Phenol, 3-chloro-.....	8270C	10
4-Chlorophenyl phenyl ether.....	7005-72-3	Benzene, 1-chloro-4-phenoxy-...	8270C	10
Chrysene.....	218-01-9	Chrysene.....	8270C	1
m-Cresol.....	108-39-4	Phenol, 3-methyl-.....	8270C	20
o-Cresol.....	95-48-7	Phenol, 2-methyl-.....	8270C	10
p-Cresol.....	106-44-5	Phenol, 4-methyl-.....	8270C	20
2,4-D; 2,4-Dichlorophenoxyacetic acid...	94-75-7	Acetic acid, (2,4-Dichlorophenoxy)-.	8270C	10
Diallate.....	2303-16-4	Carbamothioic acid, bis(1-Methylethyl)-, S- (2,3-Dichloro-2-propenyl) ester.	8270C	10
Dibenz[a,h]anthracene.....	53-70-3	Dibenz[a,h]anthracene.....	8270C	2
Dibenzofuran.....	132-64-9	Dibenzofuran.....	8270C	5
1,2-Dibromo-3-chloropropane; DBCP.....	96-12-8	Propane, 1,2-dibromo-3-chloro-.	8270C	10
Di-n-butyl phthalate.....	84-74-2	1,2-Benzenedicarboxylic acid, Dibutyl ester.	8270C	1
o-Dichlorobenzene.....	95-50-1	Benzene, 1,2-dichloro-.....	8270C	1
m-Dichlorobenzene.....	541-73-1	Benzene, 1,3-dichloro-.....	8270C	1
p-Dichlorobenzene.....	106-46-7	Benzene, 1,4-dichloro-.....	8270C	1
3,3'-Dichlorobenzidine.....	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-.	8270C	20
2,4-Dichlorophenol.....	120-83-2	Phenol, 2,4-dichloro-.....	8270C	10
2,6-Dichlorophenol.....	87-65-0	Phenol, 2,6-dichloro-.....	8270C	10
Diethyl phthalate.....	84-66-2	1,2-Benzenedicarboxylic acid, Diethyl ester.	8270C	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester.	8270C	10
Dimethoate.....	60-51-5	Phosphorodithioic acid, O,O-Dimethyl S-[2-(methylamino)-2-Oxoethyl] ester.	8270C	10
p-(Dimethylamino)azobenzene.....	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-.	8270C	10
7,12-Dimethylbenz[a]anthracene.....	57-97-6	Benz[a]anthracene, 7,12-Dimethyl-.	8270C	10
3,3'-Dimethylbenzidine.....	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-.	8270C	10
alpha, alpha-Dimethylphenethylamine.....	122-09-8	Benzeneethanamine,	8270C	50

Table II (Continued)
Semivolatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
		α,α -dimethyl-.		
2,4-Dimethylphenol.....	105-67-9	Phenol, 2,4-dimethyl-.....	8270C	10
Dimethyl phthalate.....	131-11-3	1,2-Benzenedicarboxylic acid, Dimethyl ester.	8270C	2
m-Dinitrobenzene.....	99-65-0	Benzene, 1,3-dinitro-.....	8270C	10
4,6-Dinitro-o-cresol.....	534-52-1	Phenol, 2-methyl-4,6-dinitro-..	8270C	50
2,4-Dinitrophenol.....	51-28-5	Phenol, 2,4-dinitro-.....	8270C	50
2,4-Dinitrotoluene.....	121-14-2	Benzene, 1-methyl-2,4-dinitro-.	8270C	5
2,6-Dinitrotoluene.....	606-20-2	Benzene, 2-methyl-1,3-dinitro-.	8270C	5
Dinoseb; DNB; 2-sec-Butyl- 4,6- dinitrophenol	88-85-7	Phenol, 2-(1-methylpropyl)-4,6- dinitro-.	8270C	10
Di-n-octyl phthalate.....	117-84-0	1,2-Benzenedicarboxylic acid, Diethyl ester.	8270C	2
Diphenylamine.....	122-39-4	Benzenamine, N-phenyl-.....	8270C	10
2,6-Diphenylphenol.....	2432-11-3	.....	8270C	10
Disulfoton.....	298-04-4	Phosphorodithioic acid, O,O- Diethyl S-[2- (ethylthio)ethyl]ester	8270C	10
Ethyl methanesulfonate.....	62-50-0	Methanesulfonic acid, ethyl Ester.	8270C	10
Famphur.....	52-85-7	Phosphorothioic acid, O-[4- [(dimethylamino)sulfonyl]pheny l]-O,O-dimethyl ester.	8270C	10
Fluoranthene.....	206-44-0	Fluoranthene.....	8270C	1
Fluorene.....	86-73-7	9H-Fluorene.....	8270C	1
Hexachlorobenzene.....	118-74-1	Benzene, hexachloro-.....	8270C	2
Hexachlorobutadiene.....	87-68-3	1,3-Butadiene, 1,1,2,3,4,4- Hexachloro-.	8270C	2
Hexachlorocyclopentadiene.....	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-.	8270C	10
Hexachloroethane.....	67-72-1	Ethane, hexachloro-.....	8270C	1
Hexachlorophene.....	70-30-4	Phenol, 2,2'-methylenebis[3,4,6- Trichloro-.	8270C	75
Hexachloropropene.....	1888-71-7	1-Propene, 1,1,2,3,3,3- Hexachloro-.	8270C	10
Indeno (1,2,3-cd) pyrene.....	193-39-5	Indeno[1,2,3-cd]pyrene.....	8270C	2

Table II (Continued)
Semivolatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
Isodrin.....	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a hexahydro-(1 α , 4 α , 4a β , 5 β , 8 β , 8a β)-.	8270C	10
Isophorone.....	78-59-1	2-Cyclohexen-1-one, 3,5,5-Trimethyl-.	8270C	1
Isosafrole.....	120-58-1	1,3-Benzodioxole, 5-(1-Propenyl)-.	8270C	10
Kepone.....	143-50-0	1,3,4-Metheno-2H-cyclobuta-[cd]pentalen-2-one, 1,1a,3,3a,4,5,5a,5b,6-Decachlorooctahydro-	8270C	25
Methapyrilene.....	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-Thienylmethyl)-.	8270C	10
3-Methylcholanthrene.....	56-49-5	Benz[j]aceanthrylene, 1,2-Dihydro-3-methyl-.	8270C	10
Methyl methanesulfonate.....	66-27-3	Methanesulfonic acid, methyl Ester.	8270C	10
2-Methylnaphthalene.....	91-57-6	Naphthalene, 2-methyl-.....	8270C	5
Methyl parathion; Parathion methyl.....	298-00-0	Phosphorothioic acid, O,O-Dimethyl O-(4-nitrophenyl) Ester.	8270C	10
Naphthalene.....	91-20-3	Naphthalene.....	8270C	1
1,4-Naphthoquinone.....	130-15-4	1,4-Naphthalenedione.....	8270C	10
1-Naphthylamine.....	134-32-7	1-Naphthalenamine.....	8270C	10
2-Naphthylamine.....	91-59-8	2-Naphthalenamine.....	8270C	10
o-Nitroaniline.....	88-74-4	Benzenamine, 2-nitro-.....	8270C	50
m-Nitroaniline.....	99-09-2	Benzenamine, 3-nitro-.....	8270C	50
p-Nitroaniline.....	100-01-6	Benzenamine, 4-nitro-.....	8270C	50
Nitrobenzene.....	98-95-3	Benzene, nitro-.....	8270C	2
o-Nitrophenol.....	88-75-5	Phenol, 2-nitro-.....	8270C	10
p-Nitrophenol.....	100-02-7	Phenol, 4-nitro-.....	8270C	50
4-Nitroquinoline 1-oxide.....	56-57-5	Quinoline, 4-nitro-, 1-oxide...	8270C	10
N-Nitrosodiethylamine.....	55-18-5	Ethanamine, N-ethyl-N-nitroso-.	8270C	10

Table II (Continued)
Semivolatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
N-Nitrosodimethylamine.....	62-75-9	Methanamine, N-methyl-N-nitroso-	8270C	5
N-Nitrosodi-n-butylamine.....	924-16-3	N-Nitrosodi-n-butylamine	8270C	10
N-Nitrosodiphenylamine.....	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8270C	2
N-Nitrosodipropylamine; Di-n-propylnitrosamine.	621-64-7	1-Propanamine, N-nitroso-N-Propyl-	8270C	2
N-Nitrosomethylethylamine.....	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8270C	10
N-Nitrosomorpholine.....	59-89-2	Morpholine, 4-nitroso-.....	8270C	10
N-Nitrosopiperidine.....	100-75-4	Piperidine, 1-nitroso-.....	8270C	10
N-Nitrosopyrrolidine.....	930-55-2	Pyrrolidine, 1-nitroso-.....	8270C	10
5-Nitro-o-toluidine.....	99-55-8	Benzenamine, 2-methyl-5-nitro-	8270C	10
Parathion.....	56-38-2	Phosphorothioic acid, O,O-Diethyl-O-(4-nitrophenyl) Ester	8270C	10
Pentachlorobenzene.....	608-93-5	Benzene, pentachloro-.....	8270C	10
Pentachloroethane.....	76-01-7	Ethane, pentachloro-.....	8270C	10
Pentachloronitrobenzene.....	82-68-8	Benzene, pentachloronitro-.....	8270C	10
Pentachlorophenol.....	87-86-5	Phenol, pentachloro-.....	8270C	50
Phenacetin.....	62-44-2	Acetamide, N-(4-ethoxyphenyl)..	8270C	10
Phenanthrene.....	85-01-8	Phenanthrene.....	8270C	1
Phenol.....	108-95-2	Phenol.....	8270C	10
p-Phenylenediamine.....	106-50-3	1,4-Benzenediamine.....	8270C	25
[4-(2-phenylisopropyl)phenol].....	599-64-4	Phenol, 4-Cumyl.....	8270C	10
o-Phenylphenol.....	90-43-7	Phenol, 2-phenyl-.....	8270C	10
Phorate.....	298-02-2	Phosphorodithioic acid, O,O-Diethyl S- [(ethylthio)methyl] Ester	8270C	10
2-Picoline.....	109-06-8	Pyridine, 2-methyl-.....	8270C	10
Pronamide.....	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-Dimethyl-2-propynyl)-.	8270C	10
Pyrene.....	129-00-0	Pyrene.....	8270C	1
Pyridine.....	110-86-1	Pyridine.....	8270C	10
Safrole.....	94-59-7	1,3-Benzodioxole, 5-(2-Propenyl)-.	8270C	10
Silvex; 2,4,5-TP.....	93-72-1	Propanoic acid, 2-(2,4,5-Trichlorophenoxy)-.	8270C	2
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid.	93-76-5	Acetic acid, (2,4,5-Trichlorophenoxy)-.	8270C	2
1,2,3,4-Tetrachlorobenzene.....	634-66-2	Benzene, 1,2,3,4-tetrachloro-..	8270C	10

Table II (Continued)
Semivolatile Organics

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
1,2,4,5- Tetrachlorobenzene.....	95-94-3	Benzene, 1,2,4,5-tetrachloro-..	8270C	10
2,3,4,6-Tetrachlorophenol.....	58-90-2	Phenol, 2,3,4,6-tetrachloro-...	8270C	10
Tetraethyl dithiopyrophosphate; Sulfotepp.	3689-24-5	Thiodiphosphoric acid ([(HO)2P(S)]2O), tetraethyl ester	8270C	10
4-tert-Butylphenol.....	98-54-4	.....	8270C	10
o-Toluidine.....	95-53-4	Benzenamine, 2-methyl-.....	8270C	10
1,2,3-Trichlorobenzene.....	87-61-6	Benzene, 1,2,3-trichloro-.....	8270C	10
1,2,4-Trichlorobenzene.....	120-82-1	Benzene, 1,2,4-trichloro-.....	8270C	2
2,4,5-Trichlorophenol.....	95-95-4	Phenol, 2,4,5-trichloro-.....	8270C	5
2,4,6-Trichlorophenol.....	88-06-2	Phenol, 2,4,6-trichloro-.....	8270C	10
O,O,O-Triethyl phosphorothioate.....	126-68-1	Phosphorothioic acid, O,O,O- Triethyl ester.	8270C	10
sym-Trinitrobenzene.....	99-35-4	Benzene, 1,3,5-trinitro-.....	8270C	10

Table III
Metals

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL/RL (ug/L)</u>
Aluminum.....	(Total)	Aluminum.....	6020	100
Antimony.....	(Total)	Antimony.....	6020/7040	2/1
Arsenic.....	(Total)	Arsenic.....	6020/7060A	1
Barium.....	(Total)	Barium.....	6020/6010B	5/5
Beryllium.....	(Total)	Beryllium.....	6020/6010B	1/3
Cadmium.....	(Total)	Cadmium.....	6020/6010B	0.2/5
Calcium.....	(Total)	Calcium.....	6020/6010B	300/1000
Chromium.....	(Total)	Chromium.....	6020/6010B	1/20
Cobalt.....	(Total)	Cobalt.....	6020/6010B	5/15
Copper.....	(Total)	Copper.....	6020/6010B	1/10
Iron.....	(Total)	Iron.....	6020/6010B	50/20
Lead.....	(Total)	Lead.....	6020/7421	1
Lithium.....	(Total)	Lithium.....	6010B	8
Magnesium.....	(Total)	Magnesium.....	6020/6010B	250/1000
Manganese.....	(Total)	Manganese.....	6020/6010B	5/5
Mercury.....	(Total)	Mercury.....	7470A	0.2
Nickel.....	(Total)	Nickel.....	6020/6010B	2/25
Potassium.....	(Total)	Potassium.....	6020*/6010B	250/100
Selenium.....	(Total)	Selenium.....	6020/7740	2/1
Silver.....	(Total)	Silver.....	6020/7761	0.5
Sodium.....	(Total)	Sodium.....	6020/6010B	250/1000
Thallium.....	(Total)	Thallium.....	6020/7841	1/2
Tin.....	(Total)	Tin.....	6020/7870	10/8000
Vanadium.....	(Total)	Vanadium.....	6020/6010B	2/10
Zinc.....	(Total)	Zinc.....	6020/6010B	10/10

Table IV
Anions

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
Ammonia	7664-41-7	Ammonia	350.1	50
Bicarbonate.....	(Total)	Bicarbonate.....	310.1	10,000
Carbonate.....	(Total)	Carbonate.....	310.1	10,000
Chloride.....	(Total)	Chloride.....	9056	1000
Cyanide.....	57-12-5	Cyanide.....	9012A	5
Fluoride.....	(Total)	Fluoride.....	9056	1000
Sulfate.....	(Total)	Sulfate.....	9056	2000
Sulfide.....	18496-25-8	Sulfide.....	376.2	100

Table V
Other Constituents

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
Aldrin.....	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro- 1,4,4a,5,8,8a-hexahydro- (1 α ,4 α , 4a β , 5 α ,8 α ,8a β)-	8081A	0.02
alpha-BHC.....	319-84-6	Cyclohexane, 1,2,3,4,5,6- Hexachloro-, (1 α , 2 α ,3 β , 4 α ,5 β ,6 β)-	8081A	0.02
beta-BHC.....	319-85-7	Cyclohexane, 1,2,3,4,5,6- Hexachloro-, (1 α ,2 β , 3 α ,4 β , 5 α ,6 β)-	8081A	0.02
delta-BHC.....	319-86-8	Cyclohexane, 1,2,3,4,5,6- Hexachloro- , (1 α ,2 α , 3 α , 4 β ,5 α ,6 β)-	8081A	0.02
gamma-BHC; Lindane.....	58-89-9	Cyclohexane, 1,2,3,4,5,6- Hexachloro-, (1 α , 2 α , 3 β , 4 α ,5 α ,6 β)-	8081A	0.02
Chlordane;(each isomer alpha and gamma).	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro- 2,3,3a,4,7,7a- hexahydro-.	8081A	0.02
4,4'-DDD.....	72-54-8	Benzene 1,1'-(2,2- Dichloroethyldiene) bis[4- Chloro-.	8081A	0.02
4,4'-DDE.....	72-55-9	Benzene, 1,1'- (dichloroethenyldiene) bis[4- Chloro-.	8081A	0.02

Table V (Continued)

Other Constituents

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
4,4'-DDT.....	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-chloro-.	8081A	0.02
Dieldrin.....	60-57-1	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1a α ,2 β ,2a α ,3 β ,6 β ,6a α ,7&be t,7a α)-	8081A	0.02
Endosulfan I.....	959-98-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3 α ,5a β ,6 α ,9&a,9a β)-.	8081A	0.02
Endosulfan II.....	33213-65-9	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3 α ,5a α ,6 β ,9 β ,9a α)-	8081A	0.05
Endosulfan sulfate.....	1031-07-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3,3-dioxide.	8081A	0.05

Table V (Continued)

Other Constituents

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL (ug/L)</u>
Endrin.....	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-Hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1a α , 2 β , 2a β , 3 α , 6 α , 6a β , 7 β , 7a α)-	8081A	0.02
Endrin aldehyde.....	7421-93-4	1,2,4-Methenocyclopenta[cd]pentalene-5-carboxaldehyde, 2,2a,3,3,4,7-Hexachlorodecahydro-, (1 α , 2 β , 2a β , 4 β , 4a β , 5 β , 6a β , 6b&b e, 7R*)-	8081A	0.05
Heptachlor.....	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-.....	8081A	0.02
Heptachlor epoxide.....	1024-57-3	2,5-Methano-2H-indeno[1,2-b]oxirene, 2,3,4,5,6,7,7-Heptachloro-1a,1b,5,5a,6,6a,-Hexahydro-, (1a α , 1b β , 2 α , 5 & 5a β , 6 β , 6a α)	8081A	0.02
Methoxychlor.....	72-43-5	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-.	8081A	0.05
Polychlorinated biphenyls; PCBs.....	See Note 4	1,1'-Biphenyl, chloro (derivatives)	8082	0.1
Total Organic Carbon (TOC).....			9060*	1000
Toxaphene.....	8001-35-2	Toxaphene.....	8081	0.2

Table V (Continued)Other Constituents

<u>Common Name</u>	<u>CAS #</u>	<u>Chemical Abstract Service Index Name</u>	<u>Method</u>	<u>RL</u>
			(See Note 5 regarding units)	
2378-TCDD	1746-01-6		1613b	1, 0.01
Total TCDD	41903-57-5		1613b	
12378-PeDD	40321-76-4		1613b	5, 0.05
Total PeCDD	36088-22-9		1613b	
123478-HxCDD	39227-28-6		1613b	5, 0.05
123678-HxCDD	57653-85-7		1613b	5, 0.05
123789-HxCDD	19408-74-3		1613b	5, 0.05
Total HxCDD	34465-46-8		1613b	
1234678-HpCDD	35822-46-9		1613b	5, 0.05
Total HpCDD	37871-00-4		1613b	
OCDD	3268-87-9		1613b	10, 0.1
2378-TCDF	51207-31-9		1613b	1, 0.01
Total TCDF	55722-27-5		1613b	
12378-PeCDF	57117-41-6		1613b	5, 0.05
23478-PeCDF	57117-31-4		1613b	5, 0.05
Total PeCDF	36088-22-9		1613b	
123478-HxCDF	70648-26-9		1613b	5, 0.05
123678-HxCDF	57117-44-9		1613b	5, 0.05
234678-HxCDF	60851-34-5		1613b	5, 0.05
123789-HxCDF	72918-21-9		1613b	5, 0.05
Total HxCDF	34465-46-8		1613b	
1234678-HpCDF	67562-39-4		1613b	5, 0.05
1234789-HpCDF	55673-89-7		1613b	5, 0.05
Total HpCDF	38998-75-3		1613b	
OCDF	390001-02-0		1613b	10, 0.1

Attachment C

Quality Assurance Program

DOW ENVIRONMENTAL LABORATORY
QUALITY ASSURANCE PROGRAM (QAP)

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1.0 INTRODUCTION

- 1.1. The objective of any laboratory providing environmental analyses to The Dow Chemical Company (Dow) must be to provide data of sufficiently known quality to meet or exceed applicable permit and other legal requirements. The same objectives apply to internal company laboratories and to external contract labs. This manual provides guidelines under which general permit requirements, method requirements, and work instructions, protocol specifications or standard operating procedures (SOP) will be generated and maintained. Dow will ensure all internal and external laboratories meet the criteria of this plan.
- 1.2. It is not the intent of this document to restate specific quality control (QC) procedures already contained in referenced methods or permits since they are not applied universally.
- 1.3. An organizational chart will be available upon request for Michigan Department of Environmental Quality (MDEQ) review.
- 1.4. Definitions:
 - QSDs: Quality Support Documents including SOPs, work instructions and protocol specifications.
 - SW-846 Methods – EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.¹
 - Compendium IO Methods – Determination of Inorganic Compounds in Ambient Air.²
 - Compendium TO Methods – Determination of Toxic Organic Compounds in Ambient Air.³
 - Deviation: Any activity that is not performed in accordance with the QSD is considered a deviation. Deviations may or may not affect the quality of the data. If a deviation is going to be required on a routine basis, a request in writing to formally modify the QSD should be initiated by the appropriate personnel.

2.0 QUALITY ASSURANCE

- 2.1. The objective of the Quality Assurance (QA) function is to assure that procedures are in place to produce data of known and documented quality that will meet the quality objectives of the users of the data. This is accomplished through the Analytical Sciences Laboratory quality management system.
- 2.2. Data quality assurance will be documented through annual reporting of pertinent QA/QC review information to management. The report should provide a summary of key QA activities during the applicable time period. The report will describe quality indicators observed and will document which indicators meet and do not meet acceptable QC performance criteria.
- 2.3. Any unacceptable quality indicators observed will be followed up with corrective action. If no corrective action is taken, reasons for this decision will be stated. Corrective actions taken, or reasons for no action needed, will be documented.

3.0 **QUALITY CONTROL**

3.1 Introduction

3.1.1 The procedures indicated below apply in most cases. Specific QC requirements relevant to particular activity or analyses are contained in the pertinent field, QSDs, SW-846 analytical procedures, EPA methods, or Compendium IO/TO methods.

3.1.2 Throughout the QAP document the term QSD will be used to refer to a work instruction, protocol specification, and/or SOP.

3.2 General Quality Control for field procedures are outlined as follows (Pre-sampling procedures, post-sampling procedures, equipment cleaning procedures, field data collection procedures, analytical sample specifications, and chain-of-custody information are included as individual attachments to the SAP):

3.2.1 Non-standard field information which is not found in the method should be documented in a field log with appropriate signatures and dates.

3.2.2 All pre-field activities such as equipment checkout, calibrations, and container storage and preparations will be documented.

3.2.3 Documentation of all field activities and conditions, which may have an effect on the analyses, is required.

3.2.4 Documentation of any deviations from the QSD is required. The extent of and the reason for the deviation should be documented.

3.2.5 Duplicate samples, trip, field, and equipment blanks will be taken when appropriate, as specified by the analyses methods, or project specifications.

3.3 General laboratory quality control requirements are taken from 40 CFR Part 136⁴ and SW-846.

3.3.1 The person doing the analysis (the analyst) will do an initial demonstration of their capability to generate acceptable accuracy and precision on water samples. The results of this demonstration will be kept on file.

3.3.2 The analyst will determine whether their equipment and standards meet the requirements for the analysis.

- 3.3.3 Before starting the analysis, the analyst will demonstrate the measurement system is in control. Instrument calibration and calibration frequency will be done in accordance with the applicable standard, method, and/or QSD
- 3.3.4 The appropriate blanks (trip, field, and reagent), duplicate samples or spikes, and standards will be analyzed as specified in the applicable standard, method, DQO request, and/or QSD.
- 3.3.5 Deviations, errors, deficiencies, and other non-standard events that fall outside established acceptance criteria should be investigated. In some instances, corrective action may be needed to resolve the problem and restore proper functioning to the system. The investigation of the problem and any subsequent corrective action taken should be documented.
- 3.3.6 Specific analytical procedures, reporting limits, QA/QC frequencies, and precision and accuracy requirements used in the laboratory and field programs will change with time. These changes will be reviewed. If the review reveals that the changes have been made in analytical methods or QA/QC procedures, the appropriate documents will be updated without prior approval from the agency unless prohibited by a license or other regulatory agreement. All updates will be communicated via applicable management of change procedures.
- 3.3.7 Instrument maintenance logs will be kept, signed, and dated.
- 3.3.8 Sample handling and custody requirements will follow the applicable standard, method, and/or QSD.

4.0 WORK INSTRUCTIONS, PROTOCOL SPECIFICATIONS or SOP

- 4.1 QSDs are documents which will require modification or be discontinued due to matrix, instrument, and method changes. In order to assure ourselves that the proper QSDs is being used, each document will have an effective date printed on them.
- 4.2 Non-current QSDs will be kept according to Dow's records retention policy.
- 4.3 A list of QSD documents will be kept available at the analytical facility. The list will be updated on a biannual basis, or as needed.
- 4.4 Communication of changes will be done via Management of Change (MOC) or equivalent process.

5.0 REPORTING OF DATA

- 5.1 Data will be reduced according to the analytical methods and the established laboratory procedures that will be used for the analyses.
 - 5.1.1 All information used in the calculations (e.g. raw data, calibration files, tuning records, results of standard additions, interference check results, and blank or background-correction protocols) should be recorded in order to enable reconstruction of the final result at a later date. Raw data is defined as that data which cannot be easily derived or recalculated from other information.
- 5.2 Since the data are reported to the agency under a variety of laws, permits, and other agreements, a single specific guideline cannot be established for reporting data. In general, data will be submitted to the agency under the following guidelines:
 - 5.2.1 Data may be reported using a reporting limit (RL) or a laboratory practical quantitation limit (PQL).
 - 5.2.1.1 The RL is defined as the lowest level at which measurements become quantitatively meaningful. An RL is equal to or greater than the statistically determined method detection limits (MDLs).
 - 5.2.1.2 The PQL is the lowest concentration used in the calibration of the measurement system. RLs will be reported for detection monitoring programs. In the absence of a specified RL, a PQL will be reported. Data will not be reported below the applicable RL or PQL.
 - 5.2.2 All data will be reported to two significant figures. If not reported to two significant figures, an explanation for the deviation will be provided.
 - 5.2.3 Indirect measurement instruments such as pH, electrical resistance, oxidation potential, etc. will be reported as indicated on the instrument display.
- 5.3 The raw data must be signed and dated by the analyst.
- 5.4 As an additional procedure, all data generated by the Dow Analytical Laboratories will be peer reviewed by an analyst qualified in the analytical technique. The signature of the reviewer and the date of the review must be documented with the raw data.

- 5.5 All data sets will be placed in a data packet. The data packet must be given a unique identification number to assist in tracking, archival and retrieval. The project identification, signature of analyst completing the packet, and date the packet was closed must be completed.
- 5.6 The person assigned to the Quality Assurance function will annually do a random QA/QC check of data packets and report the results of the review to the laboratory supervisor.

6.0 PERSONNEL RECORDS

- 6.1 Training and proficiency records will be maintained by employees and stored in the Dow Analytical Sciences building.
- 6.2 Records of the personnel qualifications, education, and experience will be updated annually.

7.0 RECORDS

- 7.1 Records will be maintained that provide direct supporting evidence and the necessary technical support to legally defend the data reported by the laboratory. This will require a copy of any report issued and/or any supporting documentation for the report.
- 7.2 Field and laboratory notebooks will have the pages numbered and appropriate signatures and dates. Each book will be assigned an identification number. The book will be retained according to Dow's Records Management Manual.
- 7.3 Retained laboratory records will include the following:
 - 7.3.1 Calibration records and traceability of standard and reagents.
 - 7.3.2 Documentation of the accuracy of all working standards against primary grade standards.
 - 7.3.3 A method or QSD should be referenced. A Standard or EPA method should not be referenced unless the analysis is being performed EXACTLY as described in the published method. (See SW- 846, chapter 1, paragraph 4.3.4) ¹
- 7.4 QSDs shall be kept according to Dow records retention guidelines.
- 7.5 Records will be stored in a clean, dry area with controlled access. Access to the archive is limited to administrative, quality and management personnel. Records removed from the archive will be signed out and tracked.

8.0 REFERENCE DOCUMENTS

1. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” SW-846, U.S. Government Printing Office, Publication Number: 955-001-00000-1.
2. IO Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, EPA/625/R-96/01a, July 1999.
3. Compendium of Methods for the Determination of Toxic Organic in Ambient Air, EPA/625/R-96/010b, January 1999.
4. “Code of Federal Regulations,” 40 CFR 136, Appendix A, pp. 490 and 491, (1992).

Attachment D

Chain of Custody Example

**ENVIRONMENTAL ANALYSIS LABORATORY
(EXAMPLE) CHAIN OF CUSTODY (EXAMPLE)**

Facility Sampled:	Parameter:	AL-EL Number
		Field Log Book:
		Field Log Pages:
		Frequency:
		Account No:

Number of Containers	Sample Identification	Sample Date	Filtered?	Preservatives Added?

Printed Name(s) of Sampler (s):

Signature: _____ Date: _____

I have received ___ samples in good condition from the sampler(s).

Signature: _____ Date: _____

I have received ___ samples in good condition from the preceding person

Signature: _____ Date: _____

This original copy shall remain with the samples at all time.

After completion of all testing, this copy shall be attached to the original report.

Refer to sample log book for sample time.

Note: this is an example COC Only

Attachment E

Background Data and Statistical Methodology

Statistical Methodology

1.0 Establishing Background Data Set

R 299.9612 requires collection of a series of groundwater samples to determine background concentrations. A minimum of eight samples will be used to determine the background groundwater concentrations of inorganic constituents. Results from analyses of these samples will be evaluated as discussed below. Additional sampling may be performed for including in the background data set if needed. Where existing data are available, they will be used as a background data set. Existing data are included in Appendix E of the Environmental Monitoring Plan.

2.0 Outliers Evaluation

Prior to calculating summary statistics, groundwater data will be screened for outliers using the fourth-spread outlier test (Hoaglin, Mosteller, and Tukey, 1983). The fourth-spread outlier test can identify one or more outliers from either end of the range of sample results.

The fourth-spread outlier test identifies mild and extreme outliers. A mild outlier is a statistical outlier that is any result less than the difference of the 25th percentile and 1.5 times the inter-quartile range, or any result greater than the sum of the 75th percentile and 1.5 times the inter-quartile range. An extreme outlier is a statistical outlier that is any result less than the difference of the 25th percentile and 3 times the inter-quartile range, or any result greater than the sum of the 75th percentile and 3 times the inter-quartile range. Extreme outliers are more severe than mild outliers and should be considered more influential.

The advantages of this test are that it does not rely on distributional assumptions of the data set. It also does not have any sample size requirements and can identify one or more outliers. A disadvantage of the test is that no level of significance is placed on the decision to declare a result an outlier. Also note that the choice of 1.5 times the inter-quartile range is “somewhat arbitrary, but experience with many data sets indicates that this definition serves well in identifying values that may require special attention” (Hoaglin, Mosteller, and Tukey, 1983).

While it is common for outliers to be a part of any data set, the extreme maximum value outliers in the groundwater data were removed from the data set prior to calculating summary statistics. This was done in order to prevent concentrations from being biased high.

Calculation of Summary Statistics

After removing outliers from the groundwater data as described above, summary statistics for each analyte's data set were calculated. The summary statistics calculated were sample size,

coefficient of variation, standard deviation, mean, median, minimum, maximum, percentage of non-detected samples and upper tolerance limits (UTLs).

For calculating summary statistics, numerical results are needed for every analytical measurement, even if the analytical measurement is not detected. When a sample's analytical result was defined as not detected, half the detection limit was used as the proxy values.

The UTL is an estimate of an upper bound to a percentile of the population with a prescribed confidence. For this evaluation, the 95th percentile was estimated with 95% confidence. These are standard percentile and confidence limits and can be presented as the 95/95 UTL.

To calculate the UTL, the statistical distribution (e.g., normal distribution versus lognormal distribution) for each analyte's data set (i.e., the groundwater results for each analyte from the 21 wells) had to be evaluated. The following methodology was used to determine each statistical distribution:

- If fewer than eight results were available, or if less than 15% of the results were detected above the detection limit, then no distribution was defined.
- If at least eight results were available and at least 15% of the results were detected above the detection limit, then the following steps were taken:
 - The data set was tested for normality using raw data with the Shapiro-Wilks test (with a significance level of 0.05). If the Shapiro-Wilks test showed no evidence against normality, then the distribution was defined as normal. Otherwise, data were tested for lognormality.
 - If data were not defined as normal and there were at least 15 sample results, the data set was tested for lognormality. The test of lognormality was performed using log-transformed data with the Shapiro-Wilks test (with a significance level of 0.05). If the Shapiro-Wilks test showed no evidence against lognormality, then the distribution was defined as lognormal.
 - If neither of the above distributions fit the results, no distribution was defined.

Once the statistical distribution was determined, either a normal, lognormal, or nonparametric UTL was computed. For data sets that were defined as normal, a normal UTL was calculated. For data sets that were defined as lognormal, a lognormal UTL was calculated. When the no distribution was defined, a nonparametric UTL was calculated. The rationale for defaulting to a nonparametric UTL rather than the normal UTL is that the Central Limit Theorem does not apply to population percentiles, which are the characteristics of interest when computing UTLs. The equations for calculating UTLs are provided below.

A normal UTL is calculated using the following equation:

$$UTL = \bar{x} + (K \times s),$$

where \bar{x} is the sample mean, s is the sample standard deviation, and K is a tolerance factor based on n samples, the confidence (95%), and the coverage (the 95th percentile). Values for K can be found in Gilbert (1987).

Lognormal UTL is calculated as:

$$UTL = e^{\bar{y} + (K \times s_y)},$$

where \bar{y} is the sample mean of the log-transformed results, s_y is the sample standard deviation of the log-transformed results, and K is a tolerance factor based on n samples, the confidence (95%), and the coverage (the 95th percentile). The value of K is the same whether a normal or a lognormal UTL is computed.

A nonparametric UTL is computed by first sorting the data in increasing order and assigning a unique rank to each result based on its order in the sorted data set. The m^{th} ranked result is then taken as the nonparametric UTL where m is the smallest rank that is 95% certain to be associated with a result that is at least as large as the 95th percentile. The percentile “covered” by the k^{th} ordered result at a given level of confidence is computed as:

$$p = B_{1-\alpha, k, n-k+1},$$

where n is the number of sample results, $B_{1-\alpha, k, n-k+1}$ is the 100()th percentile from a Beta distribution with shape parameters k and $n-k+1$, and $1-\alpha$ is one minus the confidence level (95%). When computing nonparametric UTLs, all concentrations (detected and non-detected) were included when ordering the results. For nondetected results, the order was based on the proxy concentration. In cases where the m^{th} ordered value was a proxy value (i.e., ND result), the next largest detected result was used as the nonparametric UTL. In cases where the percentile associated with the largest rank is less than the 95th percentile, the largest detected value was used as the nonparametric UTL.

Statistical summaries of existing background data sets are presented in Table 5.

Trend Testing

In addition to the calculated summary statistics, a trend analysis was performed for each analyte’s data set. A nonparametric test for trends called the Mann-Kendall test was used to detect an upward or downward trend for the data set. The Mann-Kendall trend test is based on the ranks of the data and therefore has no required distributional assumptions (e.g. normality). The use of the ranked observations rather than the observations themselves helps to minimize the potential impact of outliers on the results and allows the test to detect trends that are

monotonically increasing or decreasing but not necessarily linear. Computational details for this test are provided in Gilbert (1987). In order to provide control over the potential for “false positives”, the test was performed at the 0.05 significance level (i.e., p-values smaller than 0.05 were required before the test was concluded to be significant). This means that strong evidence (95% confidence) was required before a trend was labeled as “significant”.

References

Gilbert, Richard O. *Statistical Methods for Environmental Pollution Monitoring*. New York: Van Nostrand Reinhold Company. 1987.

Shapiro, S. S. and M. B. Wilk, 1965. "An Analysis of Variance Test for Normality (complete samples)," *Biometrika*, 52, 591-611.

Attachment F

Ambient Air Monitoring Program

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F.2 Dow Environmental Monitoring Method for the Determination of TSP

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F.3.1 Key Personnel

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1.0 Overview of Program

The primary objective of this Ambient Air Monitoring Program (AAMP) is to characterize the air concentrations of selected parameters and to fulfill the regulatory requirements of the Salzburg Landfill (SLF) Hazardous Waste Management Operating License.

The airborne parameter to be monitored is Total Suspended Particulate (TSP).

2.0 Objectives

The following are the objectives of the SLF AAMP:

1. Characterize the concentrations of selected monitoring parameters at SLF;
2. Supplement existing programs being used to set priorities for emission reduction projects;
3. Fulfill the regulatory requirements of:
 - a. Part 111 MID 980 617 435, and
 - b. Demonstrate compliance with National Ambient Air Quality Standards (NAAQS) for TSP/PM-10. Note: If TSP results meet the PM-10 limits, Dow will be in compliance since PM-10 is a subset of TSP.

3.0 Parameters, Methods, and Sampling Frequencies

3.1 Parameters and Methods

Table 4-1 summarizes the parameter to be monitored in this AAMP. The rationale for selecting this parameter is described in Attachment F.1. The methods used will be based on current EPA methods or slight modifications with approval.

3.1.1 Total Suspended Particulate

Attachment F.3 describes the Dow environmental monitoring methods for TSP. The frequency of TSP sampling is every 6 days at the three sites. Concentrations will be determined on HI-VOL TSP samplers using glass filters.

3.1.2 Meteorological Data

Hourly meteorological data for the Midland area will be collected at SLF each day. The location of this station is shown in Figure 1 of the Sampling and Analysis Plan (SAP). Meteorological data will be kept on site and will be made available upon request.

Attachment F.2 includes a description of the meteorological measurement station. Volumes of air sampled will be corrected to EPA Standard Conditions (25°C, 760 mm Hg) through use of average daily temperatures and pressures.

3.2 Sampling Frequency

Samples will be taken according to the NAAQS 6 day schedule as determined by the EPA. If the sample is invalidated for any reason (e.g. loss of power, equipment malfunction, etc.) the sampler will be reset and a sample will be obtained during the next regularly scheduled monitoring event. Dow will ensure that a minimum of 75 percent of the scheduled TSP samples per quarter are taken and are valid. If necessary, makeup samples may be taken to meet the 75 percent threshold.

Table 3-1. Parameters, Methods, and Associated Limits

Sampling Parameter	Total Suspended Particulates (TSP)
Sampling Apparatus	HI-VOL TSP (Glass Filter)
Sampling Duration	24-Hour
Sample Frequency	6-Day for sites 261110914, 261110917, and 261110918
Sample Volume	1600-2400 m ³ (57,000-86,000 ft ³)
Analytical Method(s)	40 CFR Part 58 Attachment F.2
Limit	150 ug/m ³ TSP*

*Limit is for PM-10. As long as TSP meets this limit, the PM-10 limit can not be exceeded.

4.0 Location and Description of Sample Collection Sites

Figure 1 of the SAP shows the location of the three monitoring stations around SLF. All sites represent off-site ambient air. Sampling equipment will be located at a height of three to ten meters.

Site # 26111914 – This monitoring site is located on the eastern most perimeter of SLF inside the fenceline south of the #93 gate.

Site # 26111917 – This monitoring site has been located along the north perimeter of SLF inside the fenceline and is closest to the current active hazardous waste cells. A minor modification to the operating license was issued which approved moving this monitoring location to the east to account for site development.

Site # 26111918 – This monitoring site is located on the southwestern perimeter of SLF inside the fenceline and is closest to the recently capped non-hazardous waste cells. This station is also located in relatively close proximity to the daily cover storage piles and to the CSX Railway.

5.0 Results and Evaluations

The overall implementation of the AAMP is described in Attachment F.4. Since the implementation of the AAMP involves several different organizational tasks, sample collection procedure documentation, vendor selection, and monitoring method documentation, the team that developed the AAMP will also coordinate its implementation.

5.1 Reports

Dow will submit the AAMP results within 60 days of the end of each quarter to the Michigan Department of Environmental Quality (MDEQ) Air Quality Division Air Monitoring Unit. Meteorological measurements will be maintained on file by Dow and made available for inspection upon request.

5.2 Quality Assurance (QA)

Within 60 days of the close of each quarter, a QA audit will be performed. Explanations for “out-of-control” analytical systems and samples collected outside specified conditions will be recorded with explanation of the corrective measures employed. This information will be available upon request.

At a minimum, one audit will be performed each quarter for air flow. “Audit” as defined by Dow’s Environmental QA Program is designed to provide data of known and documented quality. The program covers aspects of quality control (QC), personnel qualifications and training, sample collection, preservation, storage, analysis, records generation, and records review. Details of this QA/QC program are described in Dow’s Analytical Science’s Quality System Elements, and relevant Environmental Analytical Chemistry System Documents.

5.2.1 QA Coordinator

The QA coordinator or designee is responsible for providing reports to management, keeping track of documents, evaluating and storing data, audit procedures, documenting corrective action, and approving and documenting any deviations from the published sampling and analytical methods.

5.2.2 Sampling Apparatus QA

Samplers will be calibrated and maintained according to the operating instructions provided by the manufacturer and Dow Chemical Standard Operating Procedures (SOPs). Field records will cover all field observations, required equipment and sampling information.

Complete records will be maintained. These records will include, but are not limited to, the following:

- A. Apparatus name, serial number, and location;
- B. Date of maintenance, persons doing the maintenance, and what maintenance was done;
- C. All sampler calibration data, including the date, the time, the name of the person doing the calibration, and the results; and
- D. All observations and data required are in the sampling SOPs. Strict chain-of-custody procedures will be maintained to assist with the identification and tracing of the sample from the time of collection through the time of analysis and disposal. Samples will be labeled with the same description, number or location, samplers name or initials, date and time of sampling, a list of the preservatives added, and any applicable hazard information;

5.2.3 Analytical QA

Samples will be logged into the laboratory system and their condition noted. The receiving person will note any discrepancies or losses of samples before signing the chain-of-custody. Analysts will acknowledge the receipt of samples by signing the chain-of-custody forms. Samples will be stored according to the appropriate analytical method or SOP.

The standard analytical methods have very specific requirements for QA/QC and these requirements are detailed in the methods. The exact requirements for demonstrating the reliability of a developed method are normally dictated by the specific program.

Equipment calibration, maintenance records and raw data will be maintained, and standards will be traceable to the EPA or a manufacturer by name and lot number.

5.2.4 Data Reduction and Storage

The specific equations that will be used to calculate all results are included in the sampling and analytical methods.

Several stages of data confirmation will occur. All field and analytical data will be compared to the acceptance criteria of the reference method. All reports will be peer-reviewed. Data submitted to the agency will be reviewed by the QA/QC Coordinator or designee. QA/QC outliers will be treated on a case-by-case basis with appropriate action taken. Any action concerning outliers will be reported to MDEQ. Data will be retained in accordance with Part 111 Operating License records retention requirements. SOPs will be retained according to Dow records retention policies.

5.2.5 Sampler Accuracy

All sampling equipment will be audited at least once per calendar quarter. The audit will consist of a one-point flow rate check within the normal operating range of the sampler. The equipment and personnel used for auditing will be different than those used for normal equipment operation. The standards used for auditing will be traceable to NIST whenever possible. The percentage difference between the actual and measured values is used to assess accuracy of the sampling equipment. Acceptable results will be within ± 7 percent for high volume air sampler. Audit results will be maintained on file by Dow and made available for inspection upon request.

5.3 Data Evaluation Criteria

Total Suspended Particulate (TSP)	NAAQS Limits for TSP
24-Hour	150 ug/m ³
Yearly Average	50 ug/m ³

5.3.1 Exceedances

Dow will notify the MDEQ of any exceedance in the regularly scheduled quarterly report. This notification will include results of the investigation and any corrective actions that are proposed.

6.0 Criteria for Revising

6.1 Revision of SOPs, Changes to EPA Methods, and Availability of SOPs

Dow will collect and analyze samples according to the methods listed in Attachment F.3. Dow will submit proposed revisions to the AAMP to the MDEQ Chief of the Waste and Hazardous Materials Division for approval prior to implementation and shall revise any other affected document accordingly. If approved, the revision(s) to the AAMP shall become part of this license without the need for a minor license modification. Dow agrees to have their SOPs available during an audit. Contract laboratory SOPs will also be made available provided sufficient advance notice is given to obtain the documents (30 days).

Attachment F.1

Meteorological Data

Wind speed and wind direction data is gathered at the Meteorological station. It is equipped with monitors sensitive to 9.2 m/s changes in wind speed (range of 0-30 m/s) and 5° changes in wind direction (with minimum speed of 0.6 m/s). Temperature (to $0.1^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$), relative humidity, and barometric pressure (to $0.5 \text{ mb} \pm 3 \text{ mb}$) are measured at Salzburg Landfill.

The following meteorological data will be collected in accordance with EPA guidance:*

1. Mean Horizontal Velocity (mean and standard deviation);
2. Mean Wind Direction (mean and standard deviation);
3. Temperature (high and low);
4. Wind Stability Class; and
5. Relative Humidity.

A spreadsheet of these data with date, time, and weather parameters will be kept on-site and available for review upon request. These data will be used to assign and “upwind” and “downwind” of sampling stations relative to SLF.

* “Quality Assurance Handbook for Air Pollution Measurement Systems,” EPA 600/4-82-060, August 1989 Revision.

Attachment F.2

Dow Environmental Monitoring Method for the Determination of TSP

The sampling procedure for TSP is titled, “High Volume Atmospheric Suspended Particulate Matter Sampler Operating Procedures.” The analytical methods used to determine the metals in the particulate samples are listed below:

Total Suspended Particulates: 40 CFR Part 58 Attachment F.2

Attachment F.3

Project Management Plan

D.1 Key Personnel

The overall responsibility for the AAMP resides with the Environmental Manager of the Dow Midland Analytical Sciences Laboratory. The responsibility for collecting and analyzing samples and generating the quality assurance data will reside with some combination of the Environmental Services Department, the Analytical Sciences Laboratory, and contract laboratories.

The responsibility for evaluating the adequacy of the quality assurance information associated with the program and compiling a quarterly interpretative report resides with the Environmental Analytical Sciences QA Team.

D.2 Occupational Health and Safety

As a condition of employment, Dow's Standards, practices, and guidelines for protecting the health and safety of its employees must be followed at all times by all Dow employees. These practices include, but are not limited to using appropriate protective equipment when handling hazardous materials, exercising caution when climbing ladders, and driving defensively. Each of Dow's Environmental Monitoring methods will contain a section describing any special safety considerations associated with the method. Although names and positions/titles may change over time, these changes will not require modification of the AAMP.

Attachment G

Field Data Sheet

SALZBURG LANDFILL

Field Data Sheet

Sampler(s): _____ Date: _____

Sample Point ID: _____

Monitoring Program: _____

Weather: _____ Ambient Temp: _____

Wind Direction: _____ Other Activities at site: _____

Description of sampling method: _____

Purging Information

Static Water Level: _____

Purge Volume Required: _____ (*show calculations below*)

Purging Rate	Start Time	Stop Time	Σ Purge Time	Σ Volume

Was well or sump pumped dry? (Y or N) _____

Field Parameters

Temperature	Conductivity (umhos/cm)	pH (SU)	Red/Ox (mV)	DO (mg/L)

Sample bottles collected: _____

Field blank collected (include parameters): _____

Blanks are required for all non-dedicated sampling equipment

Field duplicate collected (include parameters): _____

DOW CHEMICAL COMPANY - SALZBURG LANDFILL

MONITORING WELL ID:

DATE INSPECTED:

INSPECTOR(S):

PUMP FUNCTIONING:

WELL CAP LOCKED (UNLESS LOCKABLE CAGE):

WELL CASING CONDITION:

PROTECTIVE BARRIER POSTS:

SAMPLE PORT (IF APPLICABLE):

CAGE LOCKED (Y/N) - IF APPLICABLE:

CONCRETE PAD:

WELL SIGN (TAG):

FROST HEAVING (Y/N):

STANDING WATER (Y/N):

COLLISION DAMAGE (Y/N):

WELL SUBSIDENCE (Y/N):

WELL SURVEY MARK PRESENT (Y/N):

ADDITIONAL NOTES:

MAINTENANCE / CORRECTIVE MEASURES:

DATE OF MAINTENANCE / CORRECTIVE MEASURES:

